



COMMONWEALTH of VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
***DRAFT PERMIT April 30, 2019***  
TO WITHDRAW GROUNDWATER IN THE  
EASTERN SHORE GROUNDWATER MANAGEMENT AREA

**Permit Number: GW0073300**

Effective Date: XXXXXXXX XX, 2019

Expiration Date: XXXXXXXX XX, 2034

Pursuant to Section 62.1-256 of the Ground Water Management Act of 1992 (Chapter 25, Title 62.1 of the Code of Virginia) and the Groundwater Withdrawal Regulations (Regulations) (9VAC25-610-10 *et seq.*), the State Water Control Board (Board) hereby authorizes the Permittee to withdraw and use groundwater in accordance with this permit.

Permittee Hieu H Le

Facility HT Poultry Farm

Facility Address 3254 Davis Road

New Church, VA 23415

The Permittee's authorized groundwater withdrawal shall not exceed:

5,700,000 gallons per year,  
1,600,000 gallons per month,

The permitted withdrawal will be used to provide an agricultural water supply. Other uses are not authorized by this permit.

The Permittee shall comply with all conditions and requirements of the permit.

By direction of the State Water Control Board, this Permit is granted by:

Signed \_\_\_\_\_

Date \_\_\_\_\_

Director, Office of Water Supply

This permit is based on the Permittee's application submitted on December 1, 2017, and subsequently amended to include supplemental information provided by the Permittee. The following are conditions that govern the system set-up and operation, monitoring, reporting, and recordkeeping pertinent to the Regulations.

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**Part I**  
**Operating Conditions**

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**A. Authorized Withdrawal**

1. The withdrawal of groundwater shall be limited to the following wells identified in the table below. Withdrawals from wells not included in Table 1 are not authorized by this permit and are therefore prohibited. 9VAC25-610-140.A

**Table 1**

Owner Well Name	DEQ Well #	Well Depth (ft.)	Screen Intervals ft. bls	Aquifer	Latitude	Longitude	Datum
Well 1	100-01470	195	175-195	Middle Yorktown- Eastover	37° 59' 42.6685"	-75° 31' 49.7486"	WGS84
Well 2	100-01471	195	175-195	Middle Yorktown- Eastover	37° 59' 42.0736"	-75° 31' 50.4186"	WGS84
Well 3	100-01472	195	175-195	Middle Yorktown- Eastover	37° 59' 43.5487"	-75° 31' 52.5731"	WGS84
Well 4	100-01473	195	175-195	Middle Yorktown- Eastover	37° 59' 43.0713"	-75° 31' 53.1609"	WGS84
Well 5	100-01474	195	175-195	Middle Yorktown- Eastover	37° 59' 44.4751"	-75° 31' 55.3777"	WGS84
Well 6	100-01475	195	175-195	Middle Yorktown- Eastover	37° 59' 43.6877"	-75° 31' 56.0038"	WGS84

2. Any actions that result in a change to the well operation, construction, or pump intake setting of wells included in this permit must be pre-approved by the Department of Environmental Quality (Department) in writing prior to implementing the change and a revised GW-2 Form must be submitted to the Department within 30 days after the physical construction of a well is altered or the pump intake setting has been changed. If changes are a result of an emergency, notify the Department within 5 days from the change. 9VAC25-610-140.C

**B. Pump Intake Settings**

1. The Permittee shall not place a pump or water intake device lower than the top of the uppermost confined aquifer that a well utilizes as a groundwater source or lower than the bottom of an unconfined aquifer that a well utilizes as a groundwater source in order to prevent dewatering of the aquifer, loss of inelastic storage, or damage to the aquifer from compaction. 9VAC25-610-140.A.6
2. Pump settings in individual wells are limited as follows. Any change in the pump setting must receive prior approval by the Department.

Owner Well Name	DEQ Well #	Max Pump Setting (feet below land surface)
Well 1	100-01470	174
Well 2	100-01471	174
Well 3	100-01472	174
Well 4	100-01473	174
Well 5	100-01474	174
Well 6	100-01475	174

### C. Reporting

1. Water withdrawn from each well shall be recorded consistently at the end of each month and reported to the Office of Water Supply, in paper or electronic format, on a form provided by the Department by the tenth (10<sup>th</sup>) day of each January, April, July and October for the respective previous calendar quarter. Records of water use shall be maintained by the Permittee in accordance with Part III.F, 1 through 5 of this permit.9VAC25-610-140.A.9
2. The Permittee shall report any amount in excess of the permitted withdrawal limit by the fifth (5th) day of the month following the month when such a withdrawal occurred. Failure to report may result in compliance or enforcement activities. 9VAC25-610-140.C
3. The following is a summary of reporting requirements for specific facility wells:

Owner Well Name	DEQ Well #	Reporting Requirements
Well 1	100-01470	Water Use
Well 2	100-01471	Water Use
Well 3	100-01472	Water Use
Well 4	100-01473	Water Use
Well 5	100-01474	Water Use
Well 6	100-01475	Water Use

### D. Water Conservation and Management Plan

1. The Water Conservation and Management Plan (WCMP) submitted in the application received July 24, 2018 and subsequently amended and then approved by the Department is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such.
2. By the end of the first year of the permit cycle *[date]* the Permittee shall submit a detailed description of their leak detection and repair program activities and documentation to the Department that these activities have been conducted. This documentation shall include frequency of the activities completed and the findings and results of the activities during the first year of the permit term. 9VAC25-610-100.B.1.b,2.b,or 3.b
3. As soon as completed but not later than the end of the second year of the permit cycle *[date]* the Permittee shall submit to the Department results of an audit of the total amount of groundwater used in the distribution system separately for drinking and cooling water. This audit report shall include the flock cycle start and end dates during the year, and any needed changes to the leak detection and repair program or other conservation activities. 9VAC25-610-100.B.1.b,2.b,or 3.b

4. A report on the plan's effectiveness in reducing water use, including revisions to those elements of the WCMP that can be improved and addition of other elements found to be effective based on operations to date shall be submitted by the end of years four [date] and eight [date] of the permit term. These reports shall include as appropriate: 9VAC25-610-140.C
  - a. Any new water saving equipment installed or water saving processes adopted.
  - b. The annual amounts of water used for drinking and cooling from each well or from each poultry house.
  - c. A summary of the operation of the cooling system for the houses such as what dates did the cooling system operation from each year and what months did the cooling system operate.
  - d. Evaluation of the leak detection and repair program with a summary of any significant leaks found and repaired.
  - e. A summary of the flock cycles for each year covered by the report.
5. If revisions or additions to the plan are necessary an updated WCMP shall be submitted to the Department for approval along with the report prior to implementation of the revised plan
6. Records of activities conducted pursuant to the WCMP are to be submitted to DEQ upon request.

#### **E. Mitigation Plan**

The Mitigation Plan approved on May 27, 2018 by the Department is incorporated by reference into this permit, shall have the same effect as any condition contained in this permit, and may be enforced as such. 9VAC25-610-110.D.3.g

#### **F. Well Tags**

1. Each well that is included in this permit shall have affixed to the well casing, in a prominent place, a permanent well identification plate that records, at a minimum, the DEQ well identification number, the groundwater withdrawal permit number, the total depth of the well, and the screened intervals in the well. Such well identification plates shall be in a format specified by the Board and are available from the Department. 9VAC25-610-140.A.12
2. Well tags shall be affixed to the appropriate well casing within 30 days of receiving the tags from the Department. The accompanying well tag installation certification form shall be returned to the Department within 60 days of receipt of the tags. 9VAC25-610-140.C

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### **Part II**

### **Special Conditions**

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Pursuant to 9VAC25-610-140.B and C, the following Special Conditions apply to this permit in order to protect the public welfare, safety, and health or conserve, protect and help ensure the beneficial use of groundwater.



#### **A. Meter Installation Verification/Correction**

If notified by DEQ, through an inspection report, that meters meeting the requirements set forth in Part III Condition I of this permit have not been correctly installed on each production well, in such a manner as to record total withdrawals from the well including both cooling water and drinking water, the Permittee shall correct any identified meter issues within 60 days of notification.

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### **Part III General Conditions**

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#### **A. Duty to Comply**

The Permittee shall comply with all conditions of the permit. Nothing in this permit shall be construed to relieve the permit holder of the duty to comply with all applicable federal and state statutes, regulations and prohibitions. Any permit violation is a violation of the law and is grounds for enforcement action, permit termination, revocation, modification, or denial of a permit application. 9VAC25-610-130.A

#### **B. Duty to Cease or Confine Activity**

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a permit has been granted in order to maintain compliance with the conditions of the permit. 9VAC25-610-130.B

#### **C. Duty to Mitigate**

The Permittee shall take all reasonable steps to avoid all adverse impacts that may result from this withdrawal as defined in 9VAC25-610-10 and provide mitigation of the adverse impact when necessary as described in 9VAC25-610-110.D.3.g. 9VAC25-610-130.C

#### **D. Inspection, Entry, and Information Requests**

Upon presentation of credentials, the Permittee shall allow the Board, the Department, or any duly authorized agent of the Board, at reasonable times and under reasonable circumstances, to enter upon the Permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the permit conditions, and to inspect any facilities, well(s), water supply system, operations, or practices (including sampling, monitoring and withdrawal) regulated or required under the permit. For the purpose of this section, the time for inspection shall be deemed reasonable during regular business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency. 9VAC25-610-130.D

#### **E. Duty to Provide Information**

The Permittee shall furnish to the Board or Department, within a reasonable time, any information that the Board may request to determine whether cause exists for modifying or revoking, reissuing, or terminating the permit, or to determine compliance with the permit. The Permittee shall also furnish to the Board or Department, upon request, copies of records required to be kept by regulation or this

permit. 9VAC25-610-130.E

## **F. Monitoring and Records Requirements**

1. The Permittee shall maintain a copy of the permit on-site and/or shall make the permit available upon request. 9VAC25-610-130.E
2. Monitoring of parameters shall be conducted according to approved analytical methods as specified in the permit. 9VAC25-610-130.F.1
3. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. 9VAC25-610-130.F.2
4. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three years from the date of the expiration of a granted permit. This period may be extended by request of the Board at any time. 9VAC25-610-130.F.3
5. Records of monitoring information shall include as appropriate: 9VAC25-610-130.F.4
  - a. the date, exact place and time of sampling or measurements;
  - b. the name(s) of the individual(s) who performed the sampling or measurements;
  - c. the date the analyses were performed;
  - d. the name(s) of the individual(s) who performed the analyses;
  - e. the analytical techniques or methods supporting the information, such as observations,
  - f. readings, calculations and bench data used;
  - g. the results of such analyses; and
  - h. chain of custody documentation.

## **G. Environmental Laboratory Certification**

The Permittee shall comply with the requirement for certification of laboratories conducting any tests, analyses, measurements, or monitoring required pursuant to the State Water Control Law (§ 62.1-44.2 et seq.), Environmental Laboratory Certification Program (§ 2.2-1105 et seq.), Certification for Noncommercial Environmental Laboratories (1VAC30-45), and/or Accreditation for Commercial Environmental Laboratories (1VAC30-46), and

- a. Ensure that all samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

- b. Conduct monitoring according to procedures approved under 40CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency.
- c. Periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will ensure accuracy of measurements. (1VAC30-45-20)

## **H. Future Permitting Actions**

- 1. A permit may be modified or revoked as set forth in Part VI of the Regulations. 9VAC25-610-290 and 9VAC25-610-130.G
- 2. If a Permittee files a request for permit modification or revocation, or files a notification of planned changes, or anticipated noncompliance, the permit terms and conditions shall remain effective until the Board makes a final case decision. This provision shall not be used to extend the expiration date of the effective permit. 9VAC25-610-130.G
- 3. Permits may be modified or revoked upon the request of the Permittee, or upon Board initiative, to reflect the requirements of any changes in the statutes or regulations. 9VAC25-610-130.G
- 4. The Permittee shall schedule a meeting with the Department prior to submitting a new, expanded or modified permit application. 9VAC25-610-85
- 5. A new permit application shall be submitted 270 days prior to the expiration date of this permit, unless permission for a later date has been granted by the Board, to continue a withdrawal greater than or equal to 300,000 gallons in any month while an application for a renewal is being processed. 9VAC25-610-96
- 6. A new permit application shall be submitted 270 days prior to any proposed modification to this permit that will (i) result in an increase of withdrawal above permitted limits; or (ii) violate the terms and conditions of this permit. 9VAC25610-96
- 7. The applicant shall provide all information described in 9VAC25-610-94 for any reapplication. 9VAC25-610-96.C
- 8. The Permittee must notify the Department in writing of any changes to owner and facility contact information within 30 days of the change. 9VAC25-610-140.C

## **I. Metering and Equipment Requirements**

- 1. Each well and/or impoundment or impoundment system shall have an in-line totalizing flow meter to read gallons, cubic feet, or cubic meters installed prior to beginning the permitted use. Meters shall produce volume determinations within plus or minus 10% of actual flows. 9VAC25-610-140.A.7.b
  - a. A defective meter or other device must be repaired or replaced within 30 days.
  - b. A defective meter is not grounds for not reporting withdrawals. During any period when a meter is defective, generally accepted engineering methods shall be used to estimate

withdrawals. The period during which the meter was defective must be clearly identified in the groundwater withdrawal report required by Part I, Subsection D of this permit. An alternative method for determining flow may be approved by the Board on a case-by-case basis.

2. Each well shall be equipped in a manner such that water levels can be measured during pumping and non-pumping periods without dismantling any equipment. Any opening for tape measurement of water levels shall have an inside diameter of at least 0.5 inches and be sealed by a removable plug or cap. The Permittee shall provide a tap for taking raw water samples from each permitted well. 9VAC25-610-140.A.7.e

## **J. Minor Modifications**

1. A minor modification to this permit must be made to replace an existing well(s) or add an additional well(s) provided that the well(s) is screened in the same aquifer(s) as the existing well(s), and is in the near vicinity of the existing well(s), the total groundwater withdrawal does not increase, the area of impact does not increase, and the well has been approved by the Department prior to construction. 9VAC25-610-330.B.4 and 5
2. A minor modification to this permit must be made to combine withdrawals governed by multiple permits when the systems are physically connected as long as interconnection will not result in additional groundwater withdrawal and the area of impact will not increase. 9VAC25-610-330.B.6
3. Minor modifications to this permit must also be made to:
  - a. Change an interim compliance date up to 120 days from the original compliance date, as long as the change does not interfere with the final compliance date. 9VAC25-610-330.B.7
  - b. Allow for change in ownership when the Board determines no other change in the permit is necessary and the appropriate written agreements are provided in accordance with the transferability of permits and special exceptions. 9VAC25-610-320 and 9VAC25-610-330.B.8
  - c. Revise a Water Conservation and Management Plan to update conservation measures being implemented by the Permittee that increase the amount of groundwater conserved. 9VAC25-610-330.B.9

## **K. Well Construction**

At least 30 days prior to the scheduled construction of any well(s), the Permittee shall notify the Department of the construction timetable and receive prior approval of the well(s) location(s) and acquire the DEQ Well number. All wells shall be constructed in accordance with the following requirements.

1. A well site approval letter or well construction permit must be obtained from the Virginia Department of Health prior to construction of the well. 9VAC25-610-130.A
2. A complete suite of geophysical logs (Spontaneous Potential, Single Point Resistance, 16/64 Short

and Long Normal, Natural Gamma) shall be completed for the well and submitted to the Department along with the corresponding completion report. 9VAC25-610-140.C

3. The Permittee shall evaluate the geophysical log and driller's log information to estimate the top of the target aquifer and; therefore, a depth below which the pump shall not be set. The Permittee's determination of the top of the target aquifer shall be submitted to the Department for review and approval, or approved on site by the Department's Groundwater Characterization staff, prior to installation of any pump. 9VAC25-610-140.A.6
4. The Permittee shall install gravel packs and grout in a manner that prevents leakance between aquifers. Gravel pack shall be terminated close to the top of the well screen(s) and shall not extend above the top of the target aquifer. 9VAC25-610-140.C
5. A completed GW-2 Form and any additional water well construction documents shall be submitted to the Department within 30 days of the completion of any well and prior to the initiation of any withdrawal from the well. 9VAC25-610-140.C. The assigned DEQ Well number shall be included on all well documents. 9VAC25-610-140.C
6. In addition to the above requirements, construction of a Water Level Monitoring State Observation Well (SOW) requires:
  - a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion details following review of geophysical logging. 9VAC25-610-140.C
  - b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140.C
  - c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall not be required to install the equipment. 9VAC25-610-140.C
7. In addition to the above requirements, construction of a Chloride Monitoring SOW requires:
  - a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion details following review of geophysical logging. 9VAC25-610-140.C
  - b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140.C

- c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall not be required to install the equipment. 9VAC25-610-140.C
- d. Instrumentation to meet the requirements for continuous measurement of specific conductance from multiple levels within the well screen shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall not be required to install the equipment. 9VAC25-610-140.C

#### **L. Permit Reopening**

This permit may be reopened for the purpose of modifying the conditions of the permit as follows:

- a. To meet new regulatory standards duly adopted by the Board. 9VAC25-610-140.A.11
- b. When new information becomes available about the permitted withdrawal, or the impact of the withdrawal, which had not been available at permit issuance and would have justified the application of different conditions at the time of issuance. 9VAC25-610-310.B.1
- c. When the reported withdrawal is less than 60% of the permitted withdrawal amount for a five-year period. 9VAC25-610-310.B.2
- d. If monitoring information indicates the potential for adverse impacts to groundwater quality or level due to this withdrawal. 9VAC25-610-140.C

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**PERMIT ISSUANCE FACT SHEET**

Groundwater Withdrawal Permit Number: GW0073300

Application Date: December 1, 2017

The Department of Environmental Quality (Department or DEQ) has reviewed the application for a Groundwater Withdrawal Permit. Based on the information provided in the application and subsequent revisions, DEQ has determined that there is a reasonable assurance that the activity authorized by the permit is a beneficial use as defined by the regulations. Groundwater impacts have been minimized to the maximum extent practicable. The following details the application review process and summarizes relevant information for developing the Permit and applicable conditions.

**Permittee / Legal Responsible Party**

Name & Address:	<u>Hieu H Le</u>
	<u>5318 Clarkdon Ct.</u>
	<u>Houston, TX 77066</u>
Phone:	<u>(281) 902-7668</u>

**Facility Name and Address**

Name & Address:	<u>HT Poultry Farm</u>
	<u>3254 Davis Road</u>
	<u>New Church, VA 23415</u>
Phone:	<u>(281) 902-7668</u>

**Contact Information:**

Name:	<u>Hieu H Le</u>
E-mail:	<u>hieuhuynhle@yahoo.com</u>
Phone:	<u>(281) 902-7668</u>

**Proposed Beneficial Use:**

The proposed use for this withdrawal is for agriculture. Withdrawals will supply a poultry growing operation with water for cooling of chicken houses as well as for direct consumption by poultry.

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### Processing Dates

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Processing Action	Date Occurred/Received
Pre-Application Meeting:	October 23, 2017
Application Received:	December 15, 2017
Permit Fee Deposited by Accounting:	Not Applicable
Notice of Deficiency Sent	March 1, 2018
Response to Notice of Deficiency Received:	April 2, 2018
Request for Additional Information Sent:	April 18, 2018
Response to Request for Additional Information Received:	July 24, 2018
Request for Additional Information Sent:	June 28, 2018
Response to Request for Additional Information Received:	September 4, 2018
Local Government Ordinance Form Received:	April 2, 2018
Application Complete:	June 28, 2018
Submit Request for Technical Evaluation:	December 18, 2018
Technical Evaluation Received:	February 13, 2019
Draft Permit Package Sent:	TBD
Submit Draft Permit for Public Notice:	TBD
Public Notice Published:	TBD
End of 30-Day Public Comment Period:	TBD
Response to Public comment:	TBD
Public Meeting or Hearing:	TBD

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### Application

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#### **Application Information**

HT Poultry Farm is a poultry farm owned by Hieu H Le and located in Accomack County. Mr. Lee purchased the farm during the permit application process and took responsibility for the property on November 26, 2018. The farm name was changed from Davis Farm to HT Poultry Farm. HT Poultry Farm has six (6) poultry houses and six (6) production wells. The houses measure 66 ft. by 560 ft. in size. The farm produces broilers. Additional information on how water is used at the farm is discussed in the basis of need section of the fact sheet.

Well #2 (DEQ Well #100-01471) and Well #6 (DEQ Well #100-01475) were installed in 2018 and geophysical data was collected at both well locations under the guidance of Department staff.

#### **Location of Facility/Withdrawal:**

Water Supply Planning Unit: Accomack & Northampton

County: Accomack County



GWMA/Aquifer: Eastern Shore/ Middle Yorktown-Eastover

Conjunctive Use Source: This system uses no surface water and is therefore not a conjunctive use system.

### **Withdrawal Use, Current Need, and Projected Demand:**

#### Basis of Need:

Poultry farms use groundwater to provide drinking water to the birds as well as to supply water to either misting systems or evaporative cooling pads designed to regulate temperatures in the house and keep the birds cool. Cooling is primarily required in summer.

Water use for poultry farms varies seasonally as well as in response to the poultry life cycle. Generally during winter, fall, and spring, facility withdrawals rise and fall in a predictable pattern every 50-60 days, or the length of time it takes to raise a flock, with increased usage primarily resulting from increased water consumption as the birds gain weight. This water use pattern starts with low water consumption volumes for chick development and peaks in the last 20-30 days as growers seek to maximize adult weight gains. Typically, farms raise around five flocks per year with this cycle repeating each time. During the summer, withdrawal volumes increase due to additional water usage for flock cooling purposes.

Water volumes used for consumption are controlled by a computer system that provides water to the drinker system, which provides access to water for the birds but limits spillage or excess moisture from entering the house. Avoiding excess moisture is critical to bird health and as a result, careful conservation of water is already a key tenet of management in a broiler house. The computer tracks water supplied to the drinking system and records the volume. This data was maintained by some farms but in many cases was not recorded long-term. Where available, data from the computer is discussed in the historic withdrawals section of the factsheet.

The cooling systems are operated based on temperature and humidity and while usage is typically restricted to summers, operation of the cooling systems tends to vary between farms. Historically, water supplied to the cooling systems was not metered so very limited data is available on usage.

#### Water Demand Projection:

Water demands are based on estimated drinking and cooling water amounts needed to supply all the system houses. Proposed withdrawal limits were calculated based on the total of both consumption (drinking water) and cooling. Water use for consumption was calculated based on data from a comparable farm, which is scaled and used to estimate the facilities water usage. DEQ also reviewed the provided data and applied the consumption numbers to the DEQ "Poultry Water Usage Calculations" worksheet, which indicated the volumes requested by the applicant were reasonable.

As no data on volumes used for cooling was available from farms operating on the shore, a procedure for estimating water use for cooling was developed for use based on discussions with industry stakeholders, individual farmers, and a review of available literature. House size and cooling fan capacity were identified as the major variables determining water use for cooling

poultry houses. A formula based on 1.6 gallons per year per cubic foot per minute (cfm) of cooling fan capacity was determined to be representative for the Delmarva area poultry industry. The major variable for cooling fan capacity is the width of the house as that provides for the number and size of cooling fans that can be installed. The combined total width of the houses for the facility was used as the basis to estimate cooling water use. The water use calculations are attached to the fact sheet. The permit requires metering of the wells to record total water use and actual amounts used for cooling will be collected.

A small amount of water is used for general farm operation including washing equipment, and cleaning houses between flocks. An amount of 100,000 g/y was estimated for these uses.

Water demands are not expected to change as the amount requested represents the maximum capacity of the farm and no additional houses are considered in this permit. Therefore, no projections are included for this facility.

#### Withdrawal Volumes Requested:

The applicant requested the following withdrawal volumes based upon the projected groundwater demand.

<b>Period of Withdrawal</b>	<b>Actual Volume (Gal.)</b>	<b>Volume in MGD</b>
Maximum Monthly:	2,016,528	0.113
Maximum Annual:	5,712,344	0.026

#### **DEQ Evaluation**

##### Historic Withdrawals:

No record of historic withdrawals was available for this facility as the facility was recently constructed. Refer to the DEQ Recommended Withdrawal Limits section for more information on how water use was estimated.

##### Analysis of Alternative Water Supplies:

The Eastern Shore of Virginia is an area primarily served by groundwater with the majority of withdrawals coming from the three confined Yorktown-Eastover (Upper/Middle/Lower) aquifers. There is limited surface water availability with the majority of streams being too small to supply sufficient water for most purposes, larger water bodies are typically tidally influenced, and water quality concerns have limited the development of these sources. Withdrawals from the surficial aquifer, or water table, are one viable alternative to withdrawals from the confined system. While withdrawals from the surficial aquifer can present additional water quality challenges in the form of iron forming bacteria and increased vulnerability to surface contaminants, it may be viable in some locations where capacity and quality are sufficient. In general, drinking water for poultry must be of higher quality than the cooling water. In most cases, site-specific data will be necessary

to determine the viability of the surficial aquifer and to determine what portions of the use it can supply.

Public Water Supply:

The proposed withdrawal does not contain a public water supply component.

Water Supply Plan Review:

A Water Supply Planner coordination request was sent on September 10, 2018 and a response was received on January 9, 2019. The response noted several key items.

The Accomack County Regional Water Supply Plan (Plan) includes irrigating agricultural facilities using both groundwater and surface water, with current permitted amounts sufficient to meet demands into 2040. The plan, however, does not include existing poultry farms in their assessments. While the seafood industry could also show future growth in the region, Section 4.0 of the ANPDC Groundwater Management Plan details industrial water for seafood and poultry processing, noting over 90% of industrial groundwater usage is related to poultry processing. WSP Staff note existing water quality concerns for surface waters and no significant water surpluses or sources in Accomack County to serve as alternative sources. Additionally, WSP staff reviewed the current alternatives under consideration, such as water table wells, and noted that the ability of the National Resources Conservation Service's (NRCS) Environmental Quality Incentives Program (EQIP) program to fund such efforts is currently unknown. The current lack of inclusion of poultry in the region's plan, existing water quality and alternative source concerns, and the unknown status of funding for alternative development underlines potential regional resource concerns to be addressed in future planning efforts.

DEQ Recommended Withdrawal Limits:

The recommended withdrawal limits are based on the total of both consumption (drinking water) and cooling. Water use for consumption was evaluated based on data from a comparable farm. The consumption data from a comparable farm was provided and DEQ staff reviewed the data and determined it provided a reasonable basis for estimating monthly and annual consumption for the facility. The applicant also completed the DEQ supplied poultry water consumption worksheet to establish a withdrawal volume estimate for the application.

Two mistakes were noted on the applicant's calculations during draft permit preparation. First, the applicant based their consumption calculations on eight (8) houses rather than six (6). Second, when calculating the cooling demand, the applicant also used eight (8) houses, rather than six (6), and when calculating the monthly cooling demand, they divided the total water demand by 3, rather than just the cooling demand. Correcting these mistakes in the calculations, resulted in the following withdrawal volumes:

- 5,650,000 gallons per year
- 1,600,000 gallons per month

These volumes are consistent with other farms of similar size and will be used as the permit limits for this facility.

Given the lack of data available for evaluating poultry water use, DEQ believes the methods employed are conservative enough to provide sufficient water for the farm to continue operation while still providing a reasonable limit for the permits. It is expected that as more metered data becomes available, withdrawal limits may be reduced in cases where actual water use is significantly lower than the permit limits.

Withdrawal limits were rounded to nearest hundred thousand in accordance with DEQ's April 6, 2015 "Rounding Memo". DEQ recommends the following withdrawal volumes based upon evaluation of the groundwater withdrawal permit application.

<b>Period of Withdrawal</b>	<b>Actual Volume (Gal.)</b>	<b>Volume in MGD</b>
Maximum Monthly:	1,600,000	0.053
Maximum Annual:	5,700,000	0.015

#### Technical Evaluation:

Aquaveo, LLC performed a technical evaluation of the application for the Department based on the VAHydroGW-ES model. As an aquifer pump test was not performed, the properties from the VAHydroGW-ES model were used to simulate the potential drawdown resulting from the proposed withdrawal. The model uses a base simulation which includes all existing permits (except the applicant wells) operating at their 2017 maximum annual withdrawal limit allowed under the terms of their permit for all Ground Water Management Area (GWMA) permit holders. This base simulation is then executed for 50 years. A second 50-year simulation was then conducted using the VAHydroGW-ES model with the applicant's proposed withdrawals added to the base simulation to simulate drawdown resulting from the applicant's wells using the proposed withdrawal volumes. The objectives of this evaluation were to determine the areas of any aquifers that will experience at least one foot of water level decline due to the proposed withdrawal (the Area of Impact or AOI), to determine the potential for the proposed withdrawal to cause salt-water intrusion, and to determine if the proposed withdrawal meets the 80% drawdown criteria. A summary of the results of the evaluation are provided below and the full technical evaluation is attached to this fact sheet.

Aquaveo, LLC reviewed and compared simulated 2017 water levels from the reported use to USGS measured water levels in observation wells closest to the applicant's withdrawal for the same year for the Upper, Middle, and Lower Yorktown-Eastover aquifers. Comparing the VAHydroGW-ES 2017 Historic Use Water Level with the USGS Network Well 2017 Water Level provides a method for judging the accuracy of the VAHydroGW-ES model. They noted the Upper Yorktown-Eastover 2017 VAHydroGW-ES water level is a few feet higher or lower than, the level observed in the USGS Network Well 2017 USGS observation wells in the area. The modeled Middle Yorktown-Eastover water levels are one to six feet lower, than those observed in observation wells. Finally, the modeled Lower Yorktown-Eastover water Levels are one to five feet lower than those observed in the observation wells. Aquaveo also noted that the observed water levels in all three aquifers exhibit yearly fluctuations in water levels of approximately 2 to 4 ft., with two wells, one in the Middle and one in the Lower aquifer, having fluctuations up to 35ft..

Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year. Aquaveo concluded that while there are some variations between the observed and simulated water levels, the fluctuations and general patterns observed in the USGS wells are simulated by the VAHydroGW-ES model and the water levels from the two sources are in general agreement. Differences between observed and simulated water levels will be noted and addressed during the next calibration of the VAHydroGW-ES model.

The potential for adverse changes to water quality due to increases salinity resulting from the proposed withdrawal was evaluated using transient, density-dependent, SEAWAT simulations using the VAHydroGW-ES. The results indicated that no model cells simulate an increase in chloride concentration greater than 10 mg/L due to the proposed withdrawal. Therefore, the VAHydroGW-ES model results do not indicate the potential for reduced water quality.

The results of the VAHydroGW-ES simulations predict areas of impact due to the proposed withdrawal in the Middle and Lower Yorktown-Eastover aquifers. The Area of Impact (AOI), or the area in which the withdrawal is expected to result in a drawdown of at least 1 foot, extend a maximum distance of approximately 0.5 mile from the production center in the Middle Yorktown-Eastover aquifer. As the AOI extends off the property line, a mitigation plan was required to be incorporated into the permit. The modeled area of impact determines the area for which the facility must mitigate any impacts according to the mitigation plan incorporated into this permit.

With the inclusion of the proposed withdrawal, the model simulated water levels at 13.3, -7.3, and -6.4 ft. mls for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. The 80% drawdown criterion allows the potentiometric water level (based on the critical surface elevation calculated from the VAHydroGW-ES data) to be reduced to -72.1, -126.0, and -193.3 ft. msl for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. Therefore, the water levels in the VAHydroGW-ES cell containing the applicant wells for each confined aquifer are not simulated to fall below the critical surface. Additionally, no new VAHydroGW-ES cells are simulated to have water levels fall below the critical surface. Therefore, this withdrawal is within the limits set by the 80% drawdown criterion.

Aquaveo, LLC concluded that the proposed withdrawals meet technical criteria for permit issuance. Maps of the AOIs are included in the attached Mitigation Plan.

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### **Part I**

### **Operating Conditions**

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#### **Authorized Withdrawals:**

<b>Owner Well Name</b>	<b>DEQ Well #</b>	<b>Aquifer</b>	<b>Type</b>	<b>Max Pump Setting (ft. bls)</b>
Well 1	100-01470	Middle Yorktown-Eastover	Production	174
Well 2	100-01471	Middle Yorktown-Eastover	Production	174
Well 3	100-01472	Middle Yorktown-Eastover	Production	174

Well 4	100-01473	Middle Yorktown-Eastover	Production	174
Well 5	100-01474	Middle Yorktown-Eastover	Production	174
Well 6	100-01475	Middle Yorktown-Eastover	Production	174

**Apportionment:**

Apportionment of withdrawals is expected to be fairly equally spread across all facility wells and the permit does not include apportionment limits.

**Additional Wells:**Observation Wells:

There are no known observation wells at the facility.

Abandoned Wells:

There are no known abandoned wells at the facility.

Out of Service Wells:

There are no known out of service wells at the facility.

**Pump Intake Settings:**

All six pump intakes are documented on the GW-2 Forms to be set at 160 ft. bls. All well pumps are correctly positioned in accordance with 9VAC25-610-140(A)(6).

**Withdrawal Reporting:**

Groundwater withdrawals are to be recorded monthly and reported quarterly.

**Water Conservation and Management Plan:**

A Water Conservation and Management Plan (WCMP) meeting the requirements of 9VAC25-610-100.B was submitted and reviewed as part of the application process. The accepted Plan is to be followed by the permittee as an operational Plan for the facility/water system.

- A detailed description of the leak detection and repair program activities and documentation to the Department that these activities have been conducted is due by the end of the first year of the permit term.
- A result of a 12-month audit of the total amount of groundwater used in the distribution system and the amounts for drinking and cooling water, documentation of the flock cycle start and end dates, and any necessary changes to the operation affecting water use is due by the end of the second year of the permit term.
- A report on the plan's effectiveness in maintaining or reducing water use amounts needed, including revisions to those elements of the WCMP that can be improved and addition of

other elements found to be effective based on operations to date shall be submitted by the end of years five [date] and ten [date] of the permit term.

**Mitigation Plan:**

The predicted AOI resulting from the Technical Evaluation extends beyond the property boundaries in the Middle Yorktown-Eastover and Lower Yorktown-Eastover aquifers. Given this prediction, a Mitigation Plan to address potential claims from existing well owners within the predicted area of impact is included in the permit by reference.

**Well Tags:**

Well tags will be transmitted with the final permit.

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**Part II  
Special Conditions**

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**Meter Installation/Verification:**

In cases where meters are found to be incorrectly installed or otherwise failing to capture the total water use of each well, DEQ will notify the permittee of such via an inspection report and the permittee shall correct any meter issues within 60 days.

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**Part III  
General Conditions**

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General Conditions are applied to all Groundwater Withdrawal Permits, as stated in the Groundwater Withdrawal Regulations, 9VAC25-610-10 *et seq.*

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**Public Comment**

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*The following sections will be completed after close of the public comment period.*

**Relevant Regulatory Agency Comments:**

Summary of VDH Comments and Actions:

This facility is not a public water supply so soliciting comments from VDH was not required.



## **Public Involvement during Application Process:**

### Local and Area wide Planning Requirements:

The Accomack County Administrator indicated on January 3, 2018, that the facility's operations are consistent with all ordinances.

### Public Comment/Meetings:

The public notice was published in xxxxxx on XXX. The public comment period ran from xxxxx to xxxxx

## **Changes in Permit Part II Due to Public Comments**

TBD

## **Changes in Permit Part III Due to Public Comments**

TBD

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## **Staff Findings and Recommendations**

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Based on review of the permit application, staff provides the following findings.

- The proposed activity is consistent with the provisions of the Ground Water Management Act of 1992, and will protect other beneficial uses.
- The proposed permit addresses minimization of the amount of groundwater needed to provide the intended beneficial use.
- The effect of the impact will not cause or contribute to significant impairment of state waters.
- This permit includes a plan to mitigate adverse impacts on existing groundwater users.

Staff recommends Groundwater Withdrawal Permit Number GW0073300 be issued as proposed.

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## **Attachments**

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1. **Technical Evaluation**
2. **Water Conservation Plan**
3. **Mitigation Plan**
4. **Water Use Calculation Worksheet**
5. **Public Comment Sheet**



Approved:

\_\_\_\_\_  
Director, Office of Water Supply

Date:

\_\_\_\_\_

**COMMONWEALTH of VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL QUALITY**

**TECHNICAL EVALUATION FOR PROPOSED GROUNDWATER WITHDRAWAL**

**Date:** December 14, 2018

**Application /Permit Number:** GW0073300

**Owner / Applicant Name:** Hieu H. Le

**Facility / System Name:** HT Poultry Farm

**Facility Type:** Agriculture – Poultry Farm

**Facility / System Location:** Accomack County

The Commonwealth of Virginia’s Groundwater Withdrawal Regulations (9VAC25-610-110(D)) state that, for a permit to be issued for a new withdrawal, to expand an existing withdrawal, or reapply for a current withdrawal, a technical evaluation shall be conducted. This report documents the results of the technical evaluation conducted to meet the requirements for the issuance of a permit to withdrawal groundwater within a Groundwater Management Area as defined in (9VAC25-600-10 et seq.).

This evaluation determines the:

- (1) The Area of Impact (AOI): The AOI for an aquifer is the areal extent of each aquifer where one foot or more of drawdown is predicted to occur as a result of the proposed withdrawal.
- (2) Water Quality: The potential for the proposed withdrawal to cause salt water intrusion into any portions of any aquifers or the movement of waters of lower quality to areas where such movement would result in adverse impacts on existing groundwater users or the groundwater resource as per (9VAC25-610-110(D)(2), and
- (3) The Eighty Percent Drawdown (80% Drawdown): The proposed withdrawal in combination with all existing lawful withdrawals will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the land surface and the top of the aquifer at the points where the one-foot drawdown contour is predicted for the proposed withdrawal as per 9VAC25-610-110(D)(3)(h).

**Summary of Requested Withdrawal:**

General:

In response to the Department of Environmental Quality’s (DEQ) Compliance Assistance Framework initiative, a cohort of poultry farms in Accomack County were identified as potentially requiring a groundwater withdrawal permit (GWWP). The farms primarily grow broilers which are processed by several poultry integrators located in the area. These farms use groundwater to provide drinking water to the birds as well as to supply water to either misting systems or evaporative cooling pads which cool the birds. Cooling is primarily required in summer. Most wells associated with poultry farms in Accomack County are screened in either the upper, middle, or lower Yorktown-Eastover aquifers. The use of the Columbia (water-table) aquifer is being investigated by the industry and this aquifer may be used in the future to augment withdrawals from confined aquifers where possible.

Water use for poultry farms varies seasonally as well as in response to the poultry life cycle. Generally during winter, fall, and spring, facility withdrawals rise and fall in a fairly predictable pattern every 50-60 days, with usage primarily resulting from water consumption. This pattern starts with low water

consumption volumes for chick development and maxes out in the last 20-30 days as breeders seek to maximize adult weight gains. Typically, farms raise around five flocks per year with this cycle repeating each time. During the summer, withdrawal volumes increase due to additional water usage for flock cooling purposes. A few farms have additional sanitary and other agricultural uses (crops/other livestock).

**Facility Specific:**

HT Poultry Farm has eight (8) poultry houses and six (6) production wells. The houses are 66' x 560'. Proposed withdrawal limits were calculated based on the total of both consumption (drinking water) and cooling. Water use for consumption was calculated based on data collected from a comparable farm. Water use for cooling was calculated based on estimates based on house size and cooling fan capacity.

The proposed withdrawal limits, and well construction details, are as follows:

**Proposed Withdrawal Limits:**

<b>Proposed Withdrawal Limits</b>	
<b>Annual Value</b>	5,700,000 gallons (15,616 average gpd)
<b>Monthly Value</b>	1,600,000 gallons (51,613 average gpd)

**Proposed Apportionment of Withdrawal:**

Due to the well and plumbing configuration, the withdrawal will be apportioned fairly equally between the system wells

**Production Well(s):**

Identification	Location	Construction	Pump Intake	Source Aquifer
Owner Well Name: Well #1  DEQ Well Number: 100-01470 MPID: 375943075315001	Lat: 37° 59' 42.6685" Lon: -75° 31' 49.7486" Datum: WGS84 Elevation: 22.011	Completion Date: 2018/04/24 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown-Eastover
Owner Well Name: Well #2  DEQ Well Number: 100-01471 MPID: 375942075315002	Lat: 37° 59' 42.07356" Lon: -75° 31' 50.41860" Datum: WGS84 Elevation: 21.654	Completion Date: 2018/04/40 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown-Eastover
Owner Well Name: Well #3  DEQ Well Number: 100-01472 MPID: 375944075315303	Lat: 37° 59' 43.54872" Lon: -75° 31' 52.57308" Datum: WGS84 Elevation: 21.755	Completion Date: 2018/05/10 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown-Eastover

Owner Well Name: Well #4  DEQ Well Number: 100-01473 MPID: 375943075315304	Lat: 37° 59' 43.07130" Lon: -75° 31' 53.16090" Datum: WGS84 Elevation: 21.772	Completion Date: 2018/05/03 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown- Eastover
Owner Well Name: Well #5  DEQ Well Number: 100-01474 MPID: 375944075315505	Lat: 37° 59' 44.47512" Lon: -75° 31' 55.37766" Datum: WGS84 Elevation: 21.558	Completion Date: 2018/04/14 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown- Eastover
Owner Well Name: Well #6  DEQ Well Number: 100-01475 MPID: 375944075315606	Lat: 37° 59' 43.68768" Lon: 75° 31' 56.00376" Datum: WGS84 Elevation: 21.476	Completion Date: 2018/04/06 Screens (ft-bls): 175-195 Total Depth (ft-bls): 195	150 ft-bls	Middle Yorktown- Eastover

### Geologic Setting:

The HT Poultry Farm wells (applicant wells) are located in northern Accomack County. The production wells are screened in the Middle Yorktown-Eastover aquifer. The upper portion of the Yorktown-Eastover aquifer (described in the 2006 Virginia Coastal Plain Hydrologic Framework<sup>1</sup> (VCPHF) as a combination of the Upper, Middle, and Lower Yorktown-Eastover aquifers) is composed primarily of estuarine to marine quartz sands of the Yorktown Formation of Pliocene age. The nearest USGS geologic cross section found in USGS Professional Paper 1731 is cross-section GS-GS' (see attached figure at the end of the report).

### Virginia Eastern Shore Model data:

The following table lists the location of the applicant production wells within the Virginia Eastern Shore Model<sup>2</sup> (VAHydroGW-ES).

VAHydroGW-ES Model Grid				
Well	Well Number	MPID	Row	Column
Well #1	100-01470	375943075315001	31	43
Well #2	100-01471	375942075315002	31	43
Well #3	100-01472	375944075315303	31	43
Well #4	100-01473	375943075315304	31	43
Well #5	100-01474	375944075315505	31	43
Well #6	100-01475	375944075315606	31	43

<sup>1</sup> McFarland, E.R., and Bruce, T.S., 2006, The Virginia Coastal Plain Hydrogeologic Framework: U.S. Geological Survey Professional Paper 1731, 118 p., 25 pls.

<sup>2</sup> Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.

**Hydrologic Framework:**

Data from the VCPHF is reported in this technical report to illustrate the hydrogeologic characteristics of the aquifers in the Virginia Eastern Shore near the applicant wells and identify major discrepancies between regional hydrogeology and site logs interpreted by the DEQ staff geologist.

The following average aquifer elevations were estimated from the VAHydroGW-ES at the model cell(s) containing the applicant production wells.

<b>VAHydroGW-ES Average Hydrologic Unit Information</b>		
<b>Aquifer</b>	<b>Elevation (feet msl)</b>	<b>Depth (feet bls)</b>
Surface	22	0
Columbia aquifer (bottom)	-37	59
Upper Yorktown-Eastover aquifer (top)	-94	116
Upper Yorktown-Eastover aquifer (bottom)	-134	156
Middle Yorktown-Eastover aquifer (top)	-160	182
Middle Yorktown-Eastover aquifer (bottom)	-209	231
Lower Yorktown-Eastover aquifer (top)	-244	266
Lower Yorktown-Eastover aquifer (bottom)	-322	344

**Groundwater Characterization Program Recommendations:**

DEQ staff geologist has reviewed available information and made the following determinations regarding the location of the aquifer tops for the following wells. Information reviewed in this process was driller's logs, geophysical logs, and GW-2 forms from the Well #2 and Well #6 locations, and The Virginia Coastal Plain Hydrogeologic Framework (USGS Professional Paper 1731).

<b>Unit</b>	<b>Well #1 (ft-bls)</b>	<b>#2</b>	<b>#3</b>	<b>#4</b>	<b>#5</b>	<b>#6</b>
Base of the Water Table	75	75	75	75	75	75
Top of the Upper Yorktown-Eastover	100	100	100	100	100	100
Bottom of the Upper Yorktown-Eastover	152	152	152	152	152	152
Top of the Middle Yorktown-Eastover	174	174	174	174	174	174
Bottom of the Middle Yorktown-Eastover	250	250	250	250	250	250

Note: The aquifer depths for Well #s 1, 3, 4, and 5 were extrapolated from the data collected at the Well #s 2 and #6 locations. These depths may be adjusted in the future if additional data becomes available.

**Comparison of the Hydrogeologic Framework and Groundwater Characterization Program Recommendations:**

The average Middle Yorktown-Eastover aquifer top and bottom elevations of -152.3 ft-msl/174 ft-bls and -228.3 ft-msl/250 ft-bls provided by the DEQ staff geologist are slightly higher and lower, respectively, than the elevations reported in the VAHydroGW-ES framework (-160 and -209 ft-msl). Thus, the unit thickness in the VAHydroGW-ES for the Middle Yorktown-Eastover aquifer is thinner than the unit thickness supplied by DEQ staff. Local variation not captured on the regional scale of the VAHydroGW-ES are expected to occur. The VAHydroGW-ES is updated on a regular basis to reflect the most up-to-date surface elevations that are available.

### Water Level Comparison:

Below water levels retrieved from the USGS regional observation network wells are compared to the simulated water levels reported in the *Virginia Eastern Shore 2017-2018 Annual Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use* report (the 2017-2018 report) and simulation files.<sup>3</sup> This comparison is made in order to evaluate the performance of the regional model in the vicinity of the applicant wells and assess historical groundwater trends.

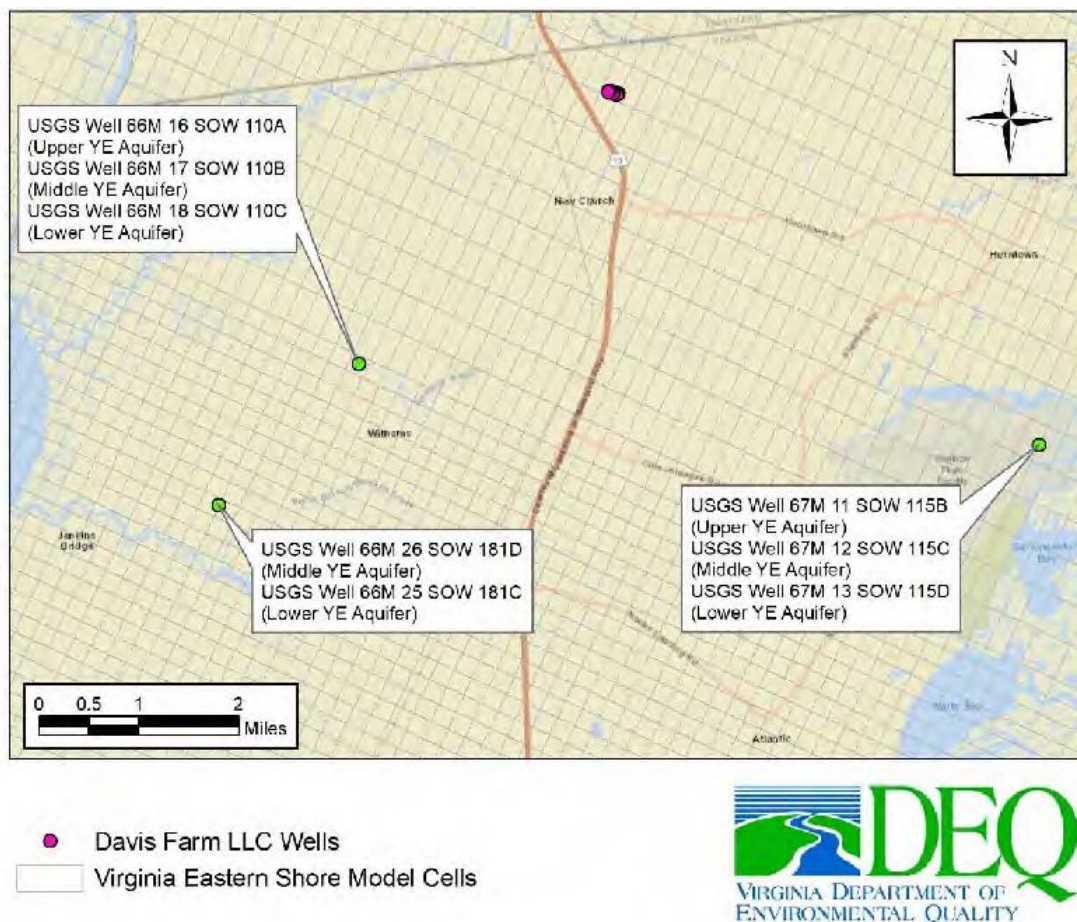
The 2017-2018 report provides two sets of simulated potentiometric water surface elevations. The VAHydroGW-ES model is divided into three parts. The first portion of the model simulates water levels within the Eastern Shore aquifers from 1900 through 2017 based upon historically reported pumping amounts (the “*Historic Use Simulation*”). This portion of the model has been calibrated to match water levels observed in USGS regional observation network wells situated throughout the peninsula. The water levels reported in the 2017-2018 report are based upon two separate simulations, each simulation running from 2018 through 2067. The simulated pumping amount in these two simulations are based upon, 1) the average 2013-2017 reported withdrawal amount of wells in the VAHydroGW-ES model (the “*Reported Use Simulation*”) and, 2) the current (2018) maximum withdrawal amount allowed under their current permit for wells in the VAHydroGW-ES model (the “*Total Permitted Simulation*”). Both these simulations are an extension of the *Historic Use Simulation* and the water levels reported in the 2017-2018 report are the final water levels simulated at the end of the simulations (2067).

The “VAHydroGW-ES 2067 Reported Use Water Level,” reported in the tables below, is the simulated water level – 50 years from present – if all permitted pumping continued at the average 2013-2017 reported withdrawal amount for the next 50 years. And the “VAHydroGW-ES 2067 Total Permitted Water Level,” reported in the tables below, is the simulated water level – 50 years from present – if all Eastern Shore permitted wells were to pump at the maximum permitted amount allowed under their current permit for the next 50 years. Finally, the “VAHydroGW-ES 2017 Historic Use Water Level,” reported in the tables below, is the water level simulated for the year 2017 in the *Historic Use Simulation*.

The nearest USGS regional observation network wells to the applicant wells, completed in the Upper, Middle, or Lower Yorktown-Eastover aquifers, are listed in the following tables and shown in Figure 1. For the USGS regional observation network wells, average 2017 reported water levels are shown in the following tables. Simulated water levels for the Upper, Middle, and Lower Yorktown-Eastover aquifers, for the VAHydroGW-ES cells containing the USGS regional observation network wells are also shown in the following tables.

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<sup>3</sup> See *Virginia Eastern Shore 2017-2018 Annual Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use* report and simulation files on file with the VA DEQ.



**Figure 1. Nearest USGS regional observation network wells.**

Comparing the VAHydroGW-ES 2017 Historic Use Water Level with the USGS Network Well 2017 Water Level provides a method for judging the accuracy of the VAHydroGW-ES. Figures 2 through 9 show graphs of the recorded water levels from the USGS observation wells listed in the following tables. These figures also show the simulated VAHydroGW-ES *Historic Use Simulation* water levels for the model cell containing each USGS well. Observing the simulated and observed water elevations together provide a second method for assessing the accuracy of the VAHydroGW-ES in the vicinity of the applicant wells.

The Upper Yorktown-Eastover VAHydroGW-ES 2017 Reported Use Water Level is a few feet lower than the USGS Network Well 2017 Water Level observed in Well 67M 11 SOW 115B; while the 2017 VAHydroGW-ES water level is a few feet higher than the level observed in Well 66M 16 SOW 110A. The water levels observed over the past approximately 40 years in both Upper Yorktown-Eastover USGS wells are shown in Figures 2 and 3. Both wells exhibit yearly fluctuations in water levels of approximately 2 to 4 feet. Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year. Water levels for Well 67M 11 SOW 115B are in general agreement with the water level simulated by the VAHydroGW-ES. Water levels for Well 66M 16 SOW 110A are approximately 4 feet lower for the period of record than those simulated by the VAHydroGW-ES.

The Middle Yorktown-Eastover VAHydroGW-ES 2017 Reported Use Water Levels are one to six feet lower than the USGS Network Well 2017 Water Levels observed in Well 67M 12 SOW 115C, Well 66M 17 SOW 110B, and Well 66M 26 SOW 181D. The water levels observed over the past 30 to 40 years in the Middle Yorktown-Eastover USGS wells are shown in Figures 4 through 6. Each well exhibits yearly

fluctuations in water levels – with Well 67M 12 SOW 115C fluctuating up to 35 feet per year. Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year. Water levels for the USGS Middle Yorktown-Eastover wells are in general agreement with the water level simulated by the VAHydroGW-ES – especially for wells 67M 12 SOW 115C and 66M 17 SOW 110B. While still reasonably accurate, water levels for 66M 26 SOW 181D are lower than and have diverged slightly from those simulated by the VAHydroGW-ES over the past 15 years.

The Lower Yorktown-Eastover VAHydroGW-ES 2017 Reported Use Water Levels are one to five feet lower than the USGS Network Well 2017 Water Levels observed in Well 67M 13 SOW 115D, Well 66M 18 SOW 110C, and Well 66M 25 SOW 181C. The water levels observed over the past 30 to 40 years in the Lower Yorktown-Eastover USGS wells are shown in Figures 7 through 9. Each well exhibits yearly fluctuations in water levels – with Well 67M 13 SOW 115D fluctuating up to 35 feet per year. Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year. Water levels for the USGS Lower Yorktown-Eastover wells are in general agreement with the water level simulated by the VAHydroGW-ES.

Differences between observed and simulated water levels will be noted and addressed during the next calibration of the VAHydroGW-ES.

<b>Upper Yorktown-Eastover Measurements</b>	<b>67M 11 SOW 115B</b>	<b>66M 16 SOW 110A</b>
Distance from applicant wells (miles)	5.5	3.7
VAHydroGW-ES Row	35	41
VAHydroGW-ES Column	71	37
VAHydroGW-ES Land Surface Elevation (ft-msl)	25	10
USGS Well Land Surface Elevation (ft-msl)	14	11
USGS Network Well 2017 Water Level (ft-msl)	3.9	1.1
VAHydroGW-ES 2017 Reported Use Water Level (ft-msl)	-0.2	4.5
VAHydroGW-ES 2067 Reported Use Water Level (ft-msl)	-0.7	4.5
VAHydroGW-ES 2067 Total Permitted Water Level (ft-msl)	-2.3	4.5

<b>Middle Yorktown-Eastover Measurements</b>	<b>67M 12 SOW 115C</b>	<b>66M 17 SOW 110B</b>	<b>66M 26 SOW 181D</b>
Distance from applicant wells (miles)	5.5	3.7	5.7
VAHydroGW-ES Row	35	41	51
VAHydroGW-ES Column	71	37	33
VAHydroGW-ES Land Surface Elevation (ft-msl)	25	10	6
Land Surface Elevation (ft-msl)	13	11	6
USGS Network Well 2017 Water Level (ft-msl)	-18.1	0.3	5
VAHydroGW-ES 2017 Reported Use Water Level (ft-msl)	-21.2	-1	-1.1
VAHydroGW-ES 2067 Reported Use Water Level (ft-msl)	-23.4	-2.1	-1.7
VAHydroGW-ES 2067 Total Permitted Water Level (ft-msl)	-31.4	-2.7	-2.1



Lower Yorktown-Eastover Measurements	67M 13 SOW 115D	66M 18 SOW 110C	66M 25 SOW 181C
Distance from applicant wells (miles)	5.5	3.7	5.7
VAHydroGW-ES Row	35	41	51
VAHydroGW-ES Column	71	37	33
VAHydroGW-ES Land Surface Elevation (ft-msl)	25	10	6
Land Surface Elevation (ft-msl)	16	11	6
USGS Network Well 2017 Water Level (ft-msl)	-11.1	-0.3	2.1
VAHydroGW-ES 2017 Reported Use Water Level (ft-msl)	-16.3	-1.1	-1.1
VAHydroGW-ES 2067 Reported Use Water Level (ft-msl)	-19	-2.2	-1.7
VAHydroGW-ES 2067 Total Permitted Water Level (ft-msl)	-22.9	-2.8	-2.2

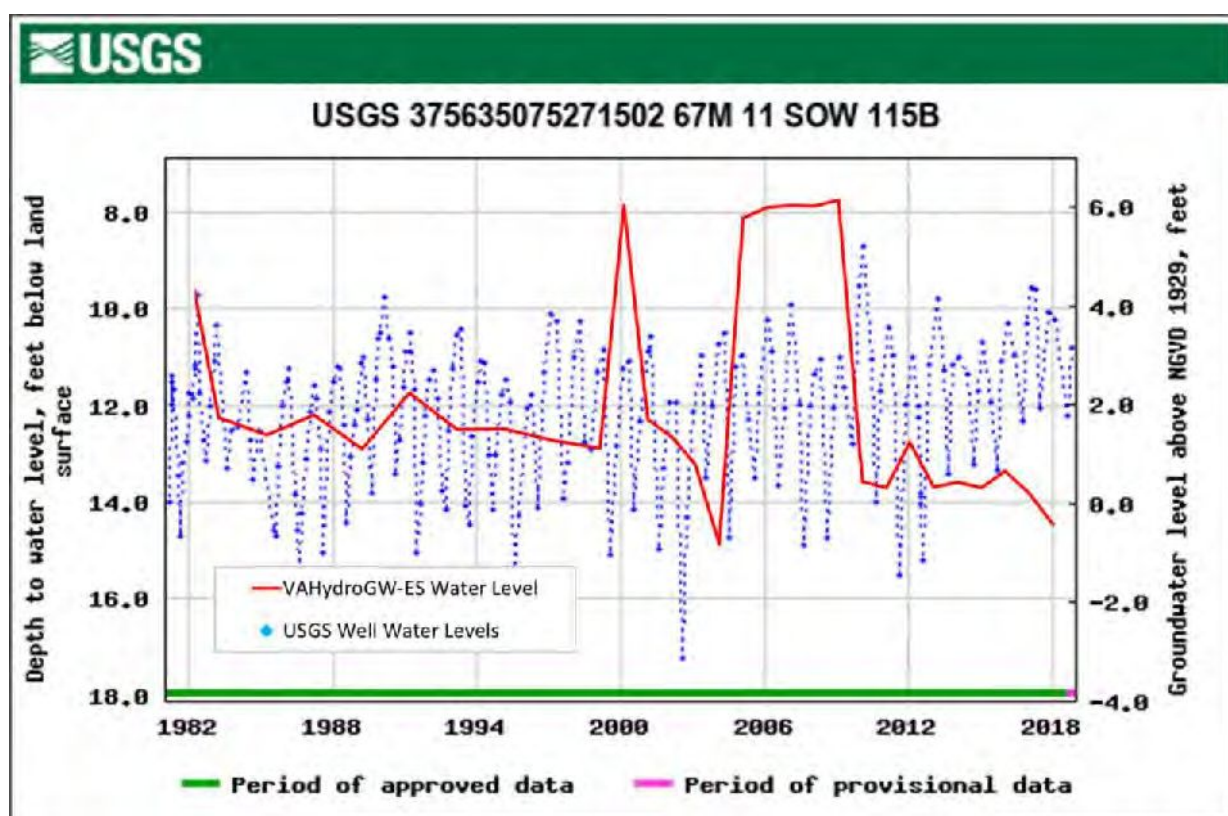


Figure 2. USGS Regional Observation Well 67M 11 SOW 115B, Upper Yorktown-Eastover aquifer water levels recorded from 1981 to present (well depth 138 ft bls, land surface 14 ft msl).

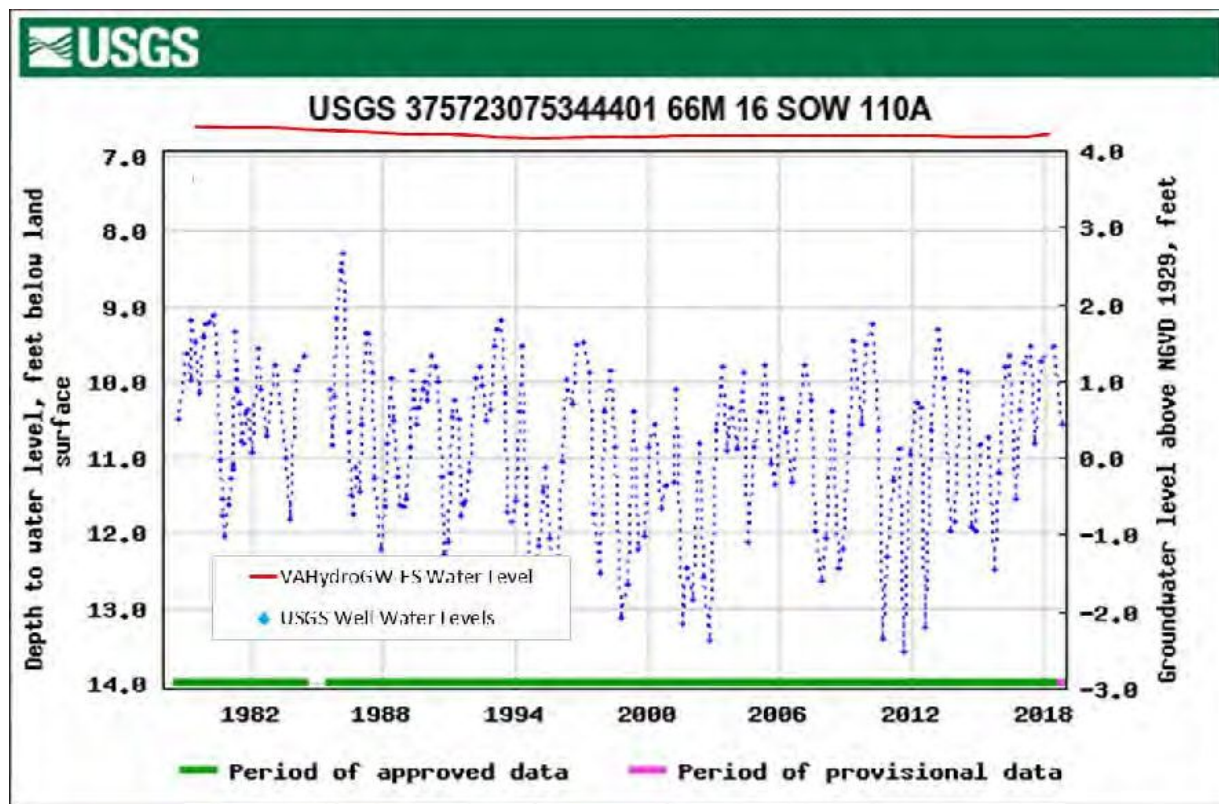


Figure 3. USGS Regional Observation Well 66M 16 SOW 110A, Upper Yorktown-Eastover aquifer water levels recorded from 1978 to present (well depth 130 ft bls, land surface 11 ft msl).

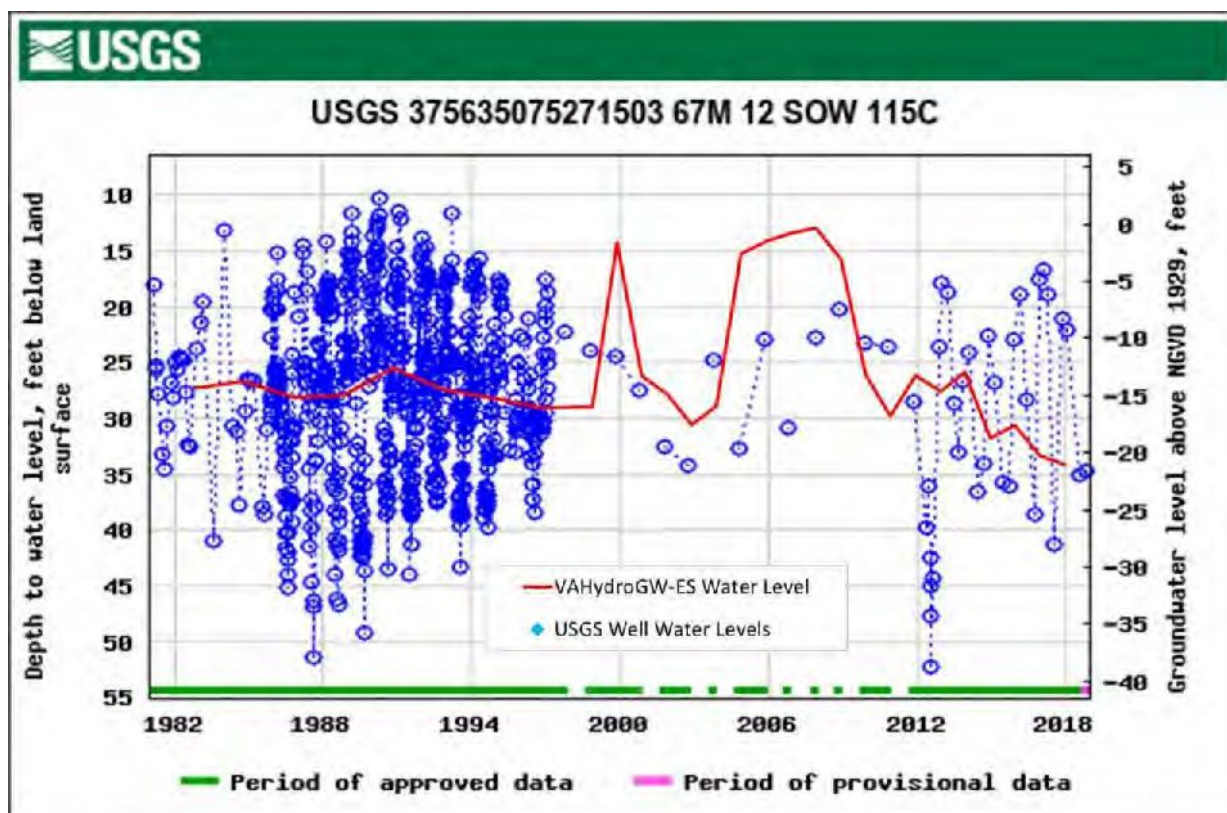


Figure 4. USGS Regional Observation Well 67M 12 SOW 115C, Middle Yorktown-Eastover aquifer water levels recorded from 1981 to present (well depth 222 ft bls, land surface 13 ft msl).



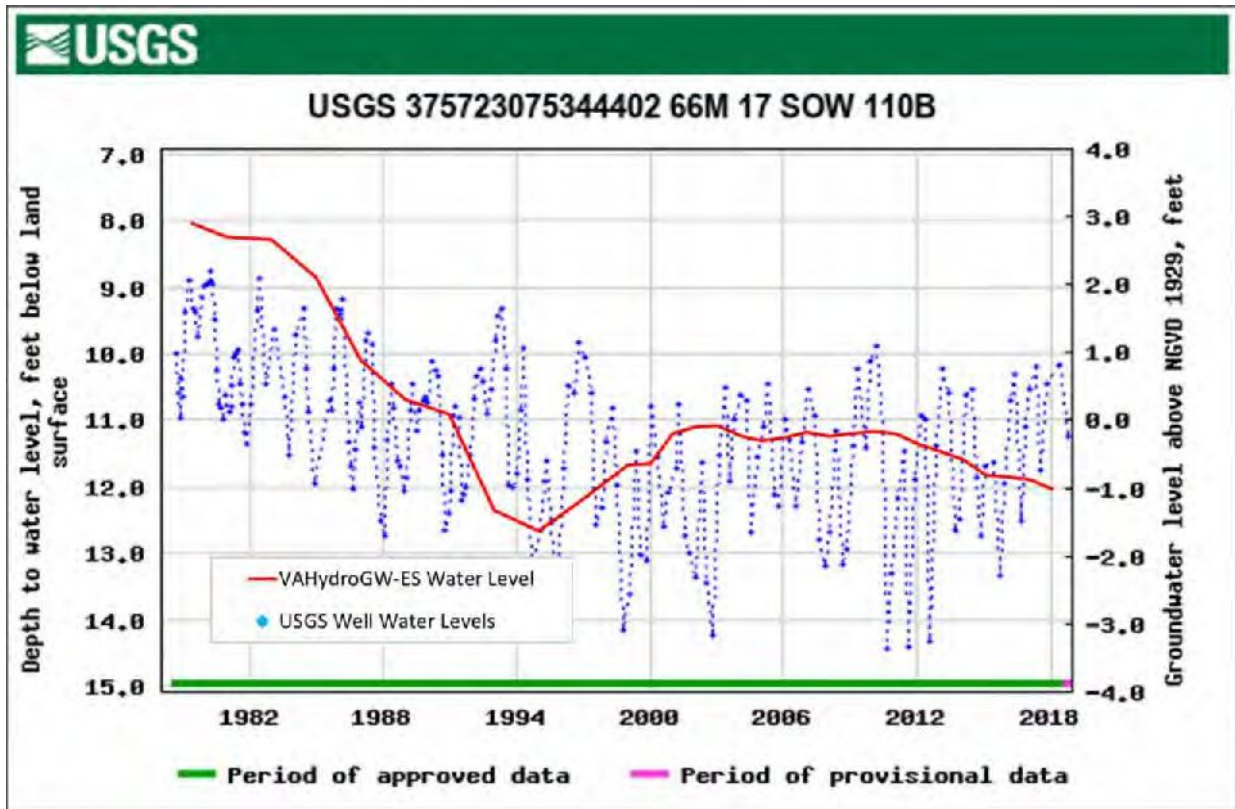


Figure 5. USGS Regional Observation Well 66M 17 SOW 110B, Middle Yorktown-Eastover aquifer water levels recorded from 1978 to present (well depth 178 ft bls, land surface 11 ft msl).

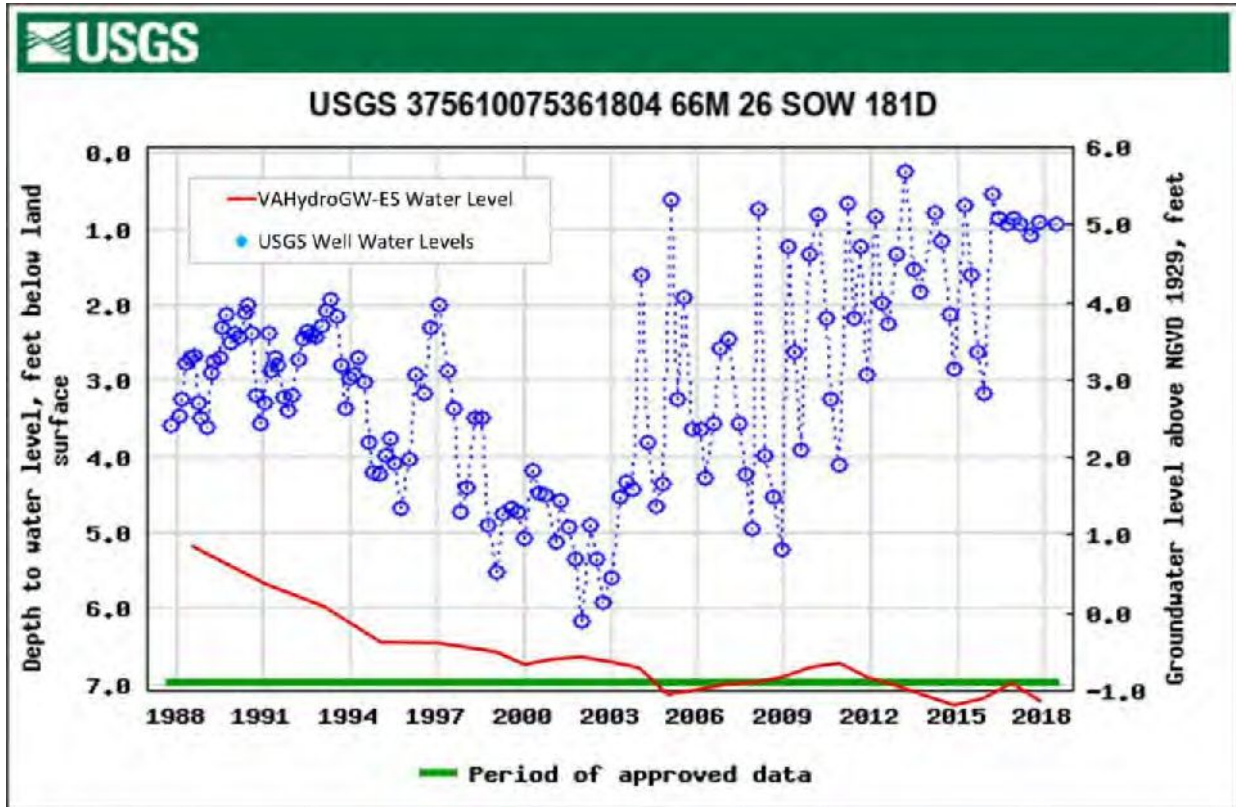


Figure 6. USGS Regional Observation Well 66M 26 SOW 181D, Middle Yorktown-Eastover aquifer water levels recorded from 1987 to present (well depth 230 ft bls, land surface 6 ft msl).

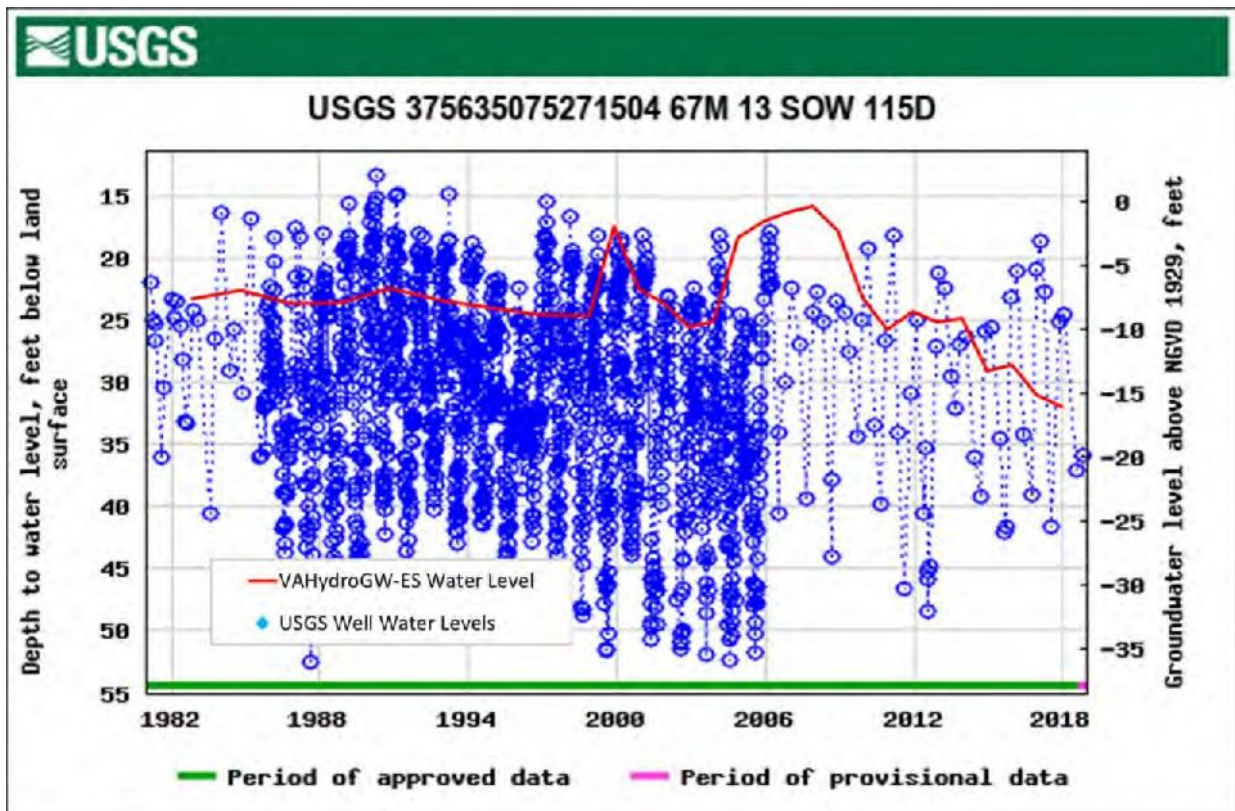


Figure 7. USGS Regional Observation Well 67M 13 SOW 115D, Lower Yorktown-Eastover aquifer water levels recorded from 1981 to present (well depth 249 ft bls, land surface 16 ft msl).

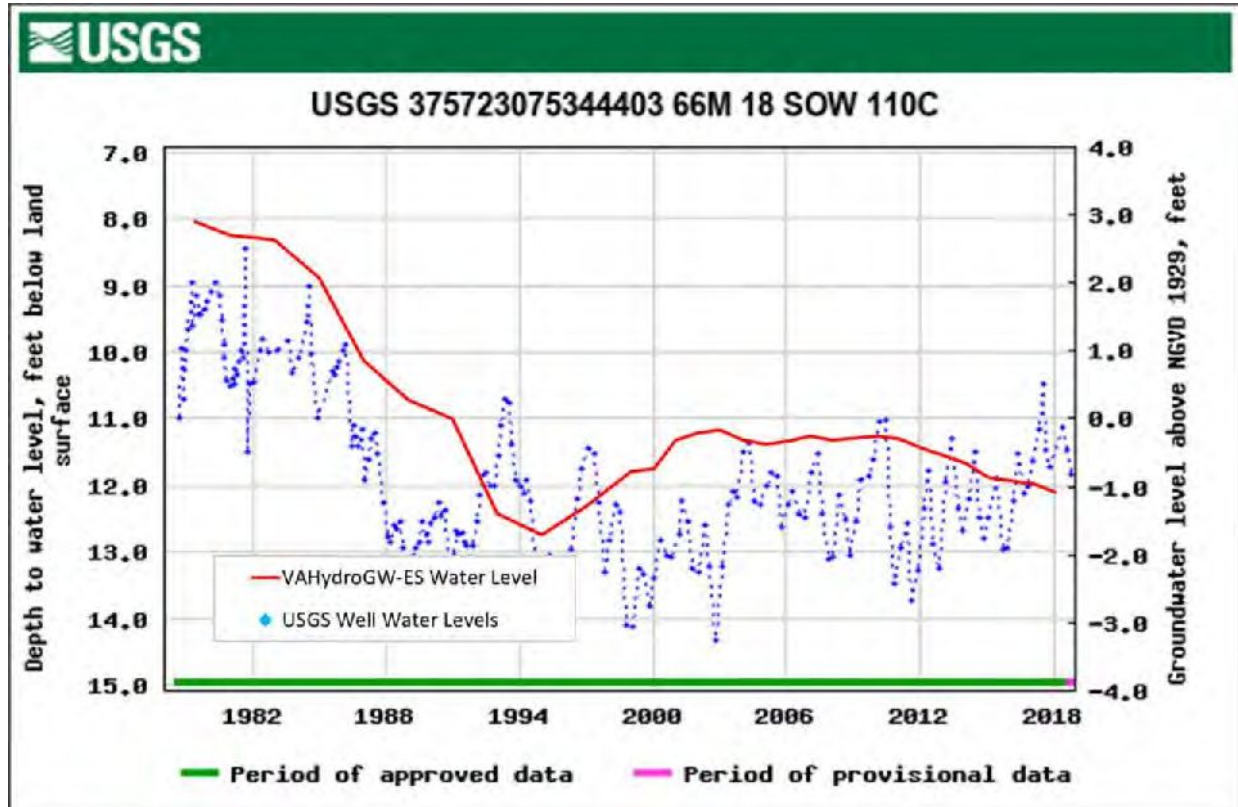


Figure 8. USGS Regional Observation Well 66M 18 SOW 110C, Lower Yorktown-Eastover aquifer water levels recorded from 1978 to present (well depth 240 ft bls, land surface 11 ft msl).



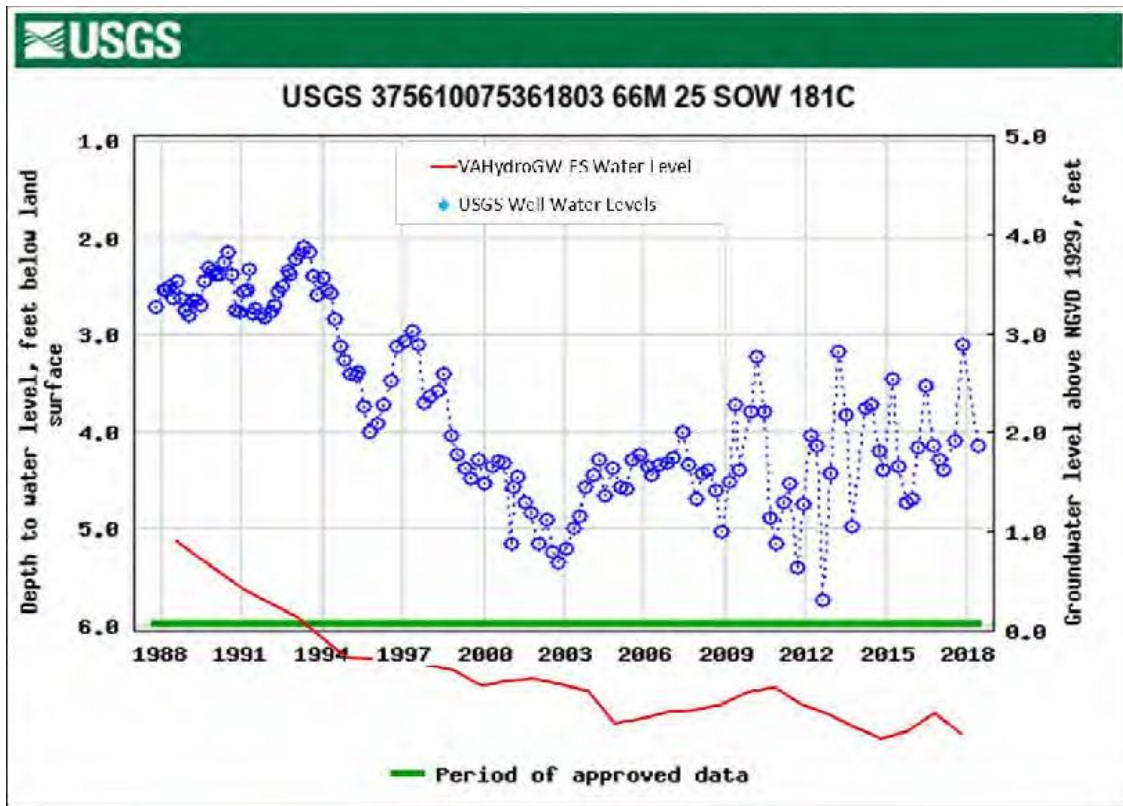


Figure 9. USGS Regional Observation Well 66M 25 SOW 181C, Lower Yorktown-Eastover aquifer water levels recorded from 1987 to present (well depth 340 ft bls, land surface 6 ft msl).

#### Aquifer Test(s):

An aquifer test has not been conducted for this system and the VAHydroGW-ES model was used to evaluate the application. The following table provides the average hydrogeologic properties assigned to the VAHydroGW-ES cell(s) containing the applicant wells.

Virginia Eastern Shore Model Hydrogeologic Properties: Row 31/Column 43							
Aquifer	Top Elevation (feet msl)	Top Elevation (feet bls)	Aquifer Thickness (feet)	Horizontal Conductivity (feet/day)	Vertical Conductivity (feet/day)	Specific Storage (1/feet)	Specific Yield
Columbia	22	0	59	75	0.5	0.00001	0.15
Upper Yorktown-Eastover	-94	116	40	6	4.8	0.000004	N/A
Middle Yorktown-Eastover	-160	182	49	4	2.3	0.000004	N/A
Lower Yorktown-Eastover	-244	266	78	11	10.9	0.000004	N/A

### Model Results

#### Evaluation of Withdrawal Impacts:

The VAHydroGW-ES model was used to simulate the effects resulting from the proposed withdrawal due to the multi-aquifer impacts. The stabilized effects resulting from the proposed withdrawal were simulated at the annual permitted withdrawal rate of 5,700,000 gallons per year (15,616 average gpd). The stabilized effects were simulated by replacing the reported use amounts in the 2017 VAHydroGW-ES Reported Use Simulation with the current maximum annual withdrawal limit allowed under the terms of their permit for all Ground Water Management Area (GWMA) permit holders. That same simulation

was executed twice, once with the proposed withdrawal removed (the *baseline simulation*), and once with the proposed withdrawal added (the *proposed withdrawal simulation*). The stabilized effects of the proposed withdrawal were considered by simulating both simulations for 50 years and observing the difference in water potentiometric levels at the end of the simulations.

#### **Area of Impact:**

The AOI for an aquifer is the area where the additional drawdown due to the proposed withdrawal exceeds one foot. The results of the VAHydroGW-ES simulations, outlined in the preceding section, predict an area of impact in the Middle Yorktown-Eastover aquifer. The AOI area extend a maximum distance of approximately 0.5 miles from the production center for the Middle Yorktown-Eastover aquifer. An AOI map is attached to this report.

#### **80 % Drawdown:**

The 80% drawdown criterion was evaluated for all impacted, confined aquifers in the Virginia Eastern Shore using the VAHydroGW-ES *proposed withdrawal simulation*. The elevations of the top of the Upper, Middle, and Lower Yorktown-Eastover aquifers at the VAHydroGW-ES cell (row 31, column 43) simulating the greatest drawdown are -94, -160, and -244 feet msl, respectively. Based on the results of the *proposed withdrawal simulation* the predicted potentiometric water levels at the same VAHydroGW-ES cell are 13.3, -7.3, and -6.4 feet msl for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. The 80% drawdown criterion allows the potentiometric water level (based on the critical surface elevation calculated from the VAHydroGW-ES data) to be reduced to -72.1, -126.0, and -193.3 feet msl in the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. Therefore, the water levels in the VAHydroGW-ES cell containing the applicant wells for each confined aquifer are not simulated to fall below the critical surface. Additionally, no new VAHydroGW-ES cells are simulated to have water levels fall below the critical surface. Therefore, this withdrawal is within the limits set by the 80% drawdown criterion.

The requested withdrawal is allocated 100% to the Middle Yorktown-Eastover aquifer. The technical evaluation analysis indicated that the apportionment of the requested withdrawal amount among the applicant production wells had no significant effect on the outcome of the technical evaluation.

#### **Water Quality:**

The EPA has established the National Secondary Drinking Water Regulations (NSDWRs) which are non-enforceable guidelines regulating contaminants that may cause cosmetic or aesthetic (such as taste, odor, or color) effects in drinking water. The EPA recommends the secondary standards to water systems – states may choose to adopt them as enforceable standards. The EPA NSDWRs specify the limit on chloride as 250 mg/L.

The VAHydroGW-ES was created "to help the Commonwealth and local water managers better plan water use and estimate future changes in water and salinity levels in response to changes in water use."<sup>4</sup> Use of the model to predict future chloride concentrations results in a "general useful understanding of system behavior, but water-resource managers must be careful in trusting the accuracy of predictions at individual wells from a regional model."<sup>5</sup> Further, chloride concentrations at individual wells, predicted using the regional model, should not be relied upon to predict actual concentrations at those locations.

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<sup>4</sup> Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.

<sup>5</sup> Sanford, W.E. and Pope, J.P., 2009, Current challenges using models to forecast seawater intrusion: lessons from the Eastern Shore of Virginia, USA. Hydrogeology Journal (2009), Volume: 18, Issue: 1, p: 73-93

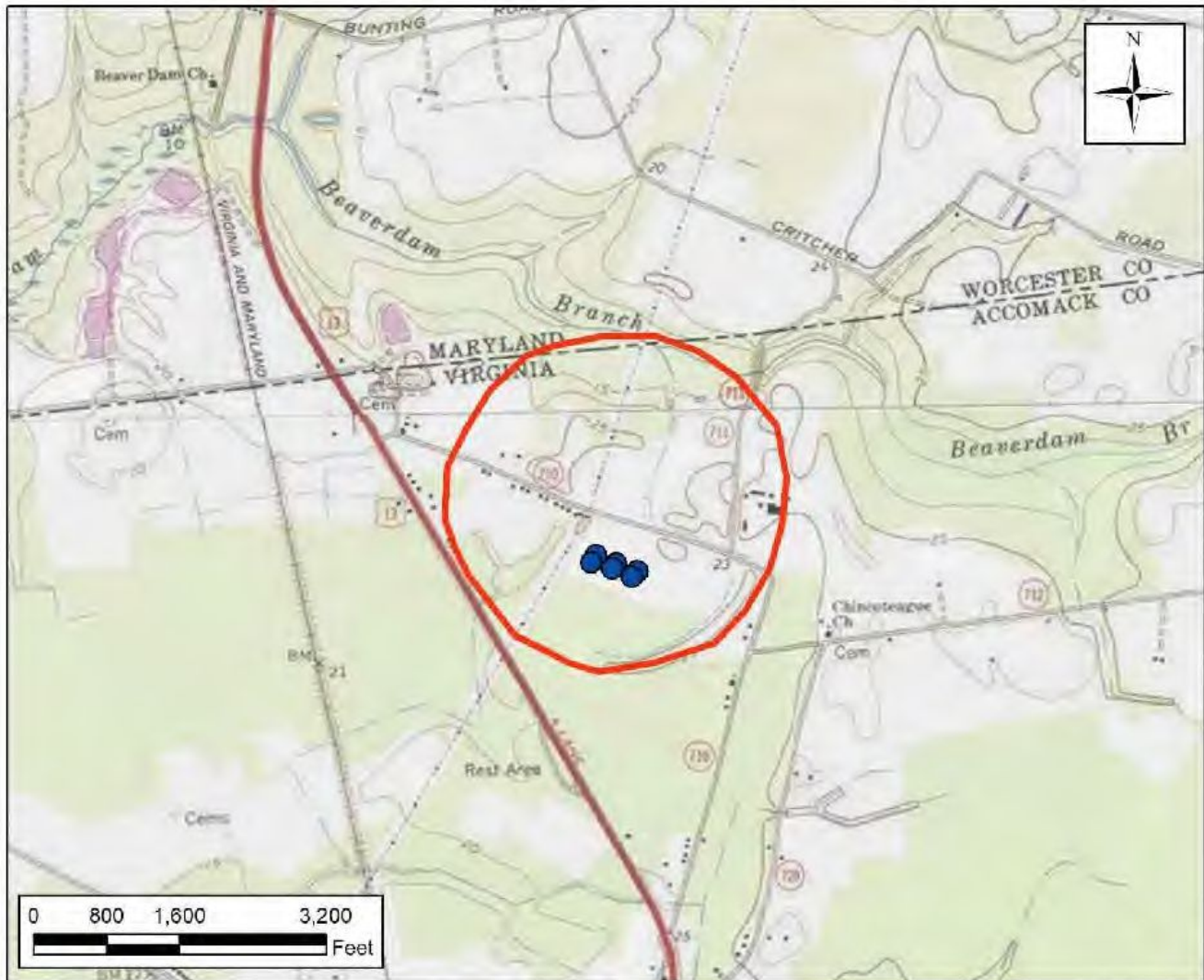
The potential for adverse changes to water quality due to the requested withdrawal was evaluated using transient, density-dependent, SEAWAT simulations using the VAHydroGW-ES. Two simulations were executed – one simulation without the proposed withdrawal included and a second with the proposed withdrawal included. Both simulations were executed for 50 years. And both used the 2017 total permitted stresses, concentrations, and heads as starting conditions. In an effort to simulate the long-term effects on water quality due to the proposed withdrawal, the amount of 5,700,000 gallons per year (15,616 average gpd) was used for the duration of the second simulation. The two simulations were compared to evaluate the potential for adverse changes to water quality. The results indicated that no model cells simulate an increase in chloride concentration greater than 10 mg/L due to the proposed withdrawal. Therefore, the VAHydroGW-ES model results do not indicate the potential for reduced water quality as a result of the proposed withdrawal.

**Conclusion:**

The withdrawal requested by Hieu H. Le for the HT Poultry Farm withdrawal satisfies the technical evaluation criteria for permit issuance. The AOIs for the Middle and Lower Yorktown-Eastover aquifers are shown in the following maps. There are no existing permitted wells located within the applicant's AOI.

# HT Poultry Farm

## Area of Impact - MiddleYorktown-Eastover Aquifer



● HT Poultry Farm Wells

○ Middle Yorktown-Eastover Aquifer Area of Impact

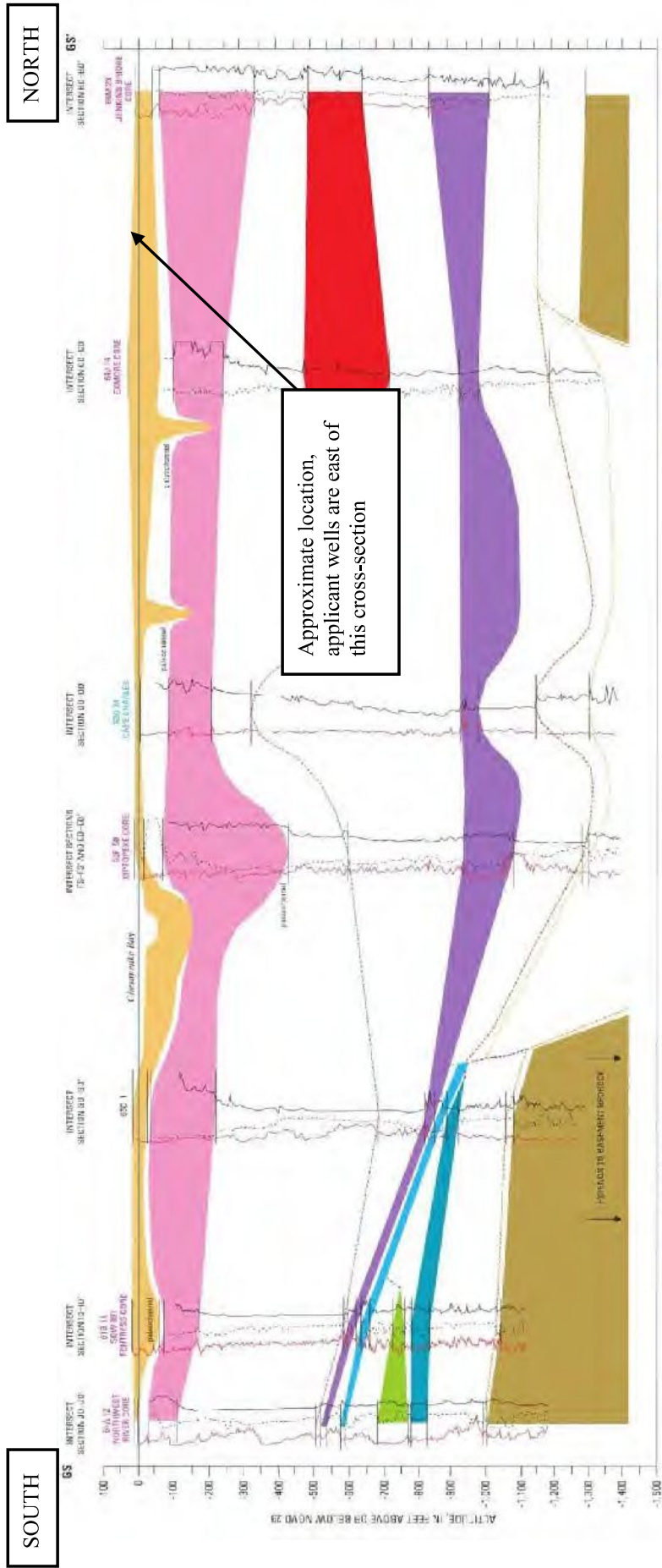
Simulated drawdown at or exceeding one foot in the Middle Yorktown-Eastover aquifer resulting from a 5,700,000 gallons per year (15,616 average gpd), 50 year withdrawal from the Middle Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.5 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply  
December 14, 2018







**Coastal Plain (2006) Cross-Sections GS-GS' from USGS Professional Paper 1731.**

## **DAVIS FARM LLC- POULTRY FARM -WCM PLAN**

### **Introduction**

Davis Farm LLC is a contract broiler farm that produces chicken for meat production. The facility consists of 8 chicken houses in the town of New Church in Accomack County, Virginia. The Farm fully understands the need to be a good steward of the region's limited groundwater resources. As a result, key operational and design considerations were made to minimize the use and loss of water in Davis Farm LLC Water Supply System.

This Water Conservation and Management Plan is designed to optimize the Farm groundwater supply and consists of the following elements:

- Practicable Water Saving Equipment and Processes
- Water Loss Reduction Program
- Water Use Education Program
- Evaluation of Practicable Water Reuse Options
- Mandatory Water Use Reductions during Shortages.

### **Practicable Water Saving Equipment and Processes**

The Farm requirements for water saving equipment and processes are implemented primarily through upgrading of equipment and maintenance of the most water efficient poultry houses. Drinker systems for all facilities are designed to provide clean, cool water with adequate flow rate fundamental to food poultry production. The use of closed nipple drinker systems ensures minimal waste of water and precludes the requirement for daily cleaning, which also conserves overall water usage. Flow rates are regularly checked and water consumption is monitored daily with any substantial change in water usage investigated. Evaporative Cooling Pads are utilized only at temperatures above 82° F and recirculate water until evaporated in order to conserve water while still meeting their designed purpose of providing temperature relief in hot conditions for efficient poultry production. The troughs are constructed of corrosion proof, ultraviolet stabilized PVC components to eliminate bacteria and algae growth. Management techniques that do not involve water consumption are also utilized in hot conditions such as walking the birds and feed removal.

The Farm management diligently seeks to save water. The saving of water reduces the electrical cost for running the well pumps, storage tanks, float switch and booster pumps. Management at the Farm will regularly review water consumption electronically and by I-Phone apps which alerts the farmer or staff of any below average or abnormal variations in the system. These variations that are monitored are air, moisture, temperature, and electric power. If the power goes down, there are stand-by diesel- driven generators to be used to provide electric to the houses and wells. Underground water leakage detection can only be determined by spikes in the water meter rates. Once a rate increase is noted or an alert goes out over the cell app, the owner and staff search to discover the location of the leak(s) and repairs begin within the hour after it has been discovered.

## **DAVIS FARM LLC -POULTRY FARM -WCM PLAN, PAGE 2**

### **Water Loss Reduction Program**

#### **Water Loss Audit**

If granted a permit Davis Farm LLC will implement a water audit program within the first 24 months of the permit term. The audit and monthly inspections should eliminate leakage problems by early detection and will be conducted prior to and continue after the audit has been implemented. Annually a water loss audit will be conducted to determine the volume and nature of lost and unaccounted-for water within the water supply system. The purpose of the audit is to identify sources of demand that would normally escape detection by the metering system. Audits are conducted on a flock by flock basis once a flock is harvested. The facility is inspected for leaks and broken pipes which can not be detected during the growth period of the chickens. Weekly inspections are made around the facilities pump houses and wells.

#### **Leak Detection and Repair from Distribution System**

This farm is monitored on a 24 hours basis by the owner/facility's manager and one or two onsite workers. The houses' cooling and watering systems are inspected and repaired after each flock reaches maturity. All repairs are completed before the next flock comes in. Underground water leakage detection can only be determined by spikes in the water meter rates. Once a rate increase is noted or an alert goes out over the cell app, the owner and staff immediately search to discover the location of the leak(s) and repairs begin within the hour after it has been discovered.

#### **Leak Detection and Repair for Individual Chicken Houses**

The Farm staff and management team will pay close attention to abnormal water consumption and if the house controller indicates a higher than normal water requirement, staff and management will come together to find and repair the leaks within the hour after it has been discovered.

### **Water Use Education Program**

#### **Employee Training**

All employees on the Davis Farm LLC are encouraged to conserve water and identify potential leaks when hired, during training, and the use of regular conversational reminders and may be required to attend any DPI classes offered.

## **DAVIS FARM LLC -POULTRY FARM -WCM PLAN, PAGE 3**

Specifically, employees will be instructed in the ways in which they could use less water (or no water) for a given task.

### **Evaluation of Practicable Water Reuse Options**

This facility is still under construction and therefore have limited opportunities to explore water reuse projects for Poultry Farm. The likelihood of a reuse project occurring is remote at this time, given the current water-saving equipment in place and inability to practicably treat collected storm water to standards or quality that can be utilized for flock consumption. The use of nearby surface water would not be sufficient for consumption purposes due to the Water Quality and the possibility of disease found in the local wildlife and waterfowl. The most notable being Bird flu, or Avian Influenza, which can be spread by waterfowl to flocks. These flocks are constantly and carefully immunized to prevent the spread of diseases and to promote healthy birds, and water quality plays a major role in flock health. Should a water use arise that could utilize non-potable water, then a Water Re-use Evaluation will be conducted at that time.

### **Mandatory Water Use Reductions during Shortages**

The facility will comply with all applicable sections of the Accomack County Drought Response and Contingency Plan as identified in the Accomack County Water Supply Plan. This includes voluntary water use restrictions in drought watch and mandatory water use restrictions in a drought emergency. Under mandatory water reductions during shortages, it is not feasible to reduce the amount of water which is needed to be provided in order to produce healthy birds.

The only waste water produced by these facilities is the water used to wash off the cooling coils and cooling fans. During emergency water shortages, air may be used to dislodge dust particles from this equipment.

## **MITIGATION PLAN**

**DEQ GROUNDWATER WITHDRAWAL PERMIT NO. GW0073300**

**OWNER NAME: Thomas Davis**

**FACILITY NAME: Davis Farm LLC.**

**LOCATION: Davis Road New Church, Virginia 23415**

### **INTRODUCTION**

On March 26, 2018, Thomas Davis submitted a Groundwater Withdrawal Permit Application to the Virginia Department of Environmental Quality (DEQ) to withdraw groundwater. Groundwater withdrawals associated with this permit will be utilized to supply a poultry operation.

The purpose of this Mitigation Plan is to provide existing groundwater users a method to resolve claims that may arise due to the impact of the withdrawal from Davis Farm LLC. well field. Predicted drawdown of water levels due to the withdrawal(s) from the Yorktown – Eastover aquifers in use by the facility wells aquifer(s) are shown in the attached maps(s).

Modeled impacts, as shown on the attached maps, extend beyond the boundary of the Davis Farm LLC. facility. Due to these findings, Thomas Davis recognizes that there will be a rebuttable presumption that water level declines that cause adverse impacts to existing groundwater users within the area of impact are due to this withdrawal. Claims may be made by groundwater users outside this area; however, there is a rebuttable presumption that Thomas Davis / Davis Farm LLC. has not caused the adverse impact. Thomas Davis proposes this plan to mitigate impacts to existing users and excludes impacts to wells constructed after the effective date of this permit.

### **CLAIMANT REQUIREMENTS**

To initiate a claim, the claimant must provide written notification of the claim to the following address:

Contact Name	<u>Thomas Davis</u>
Title	<u>Owner</u>
Permittee Name	<u>Davis Farm LLC.</u>
Address	<u>3093 Tulls Mill Road</u>
City, State Zip Code	<u>New Church, Va. 23415</u>

The claim must include the following information: (a) a deed or other available evidence that the claimant is the owner of the well and the well was constructed and operated prior to the effective date of the permit; (b) all available information related to well construction, water levels, historic yield, water quality, and the exact location of the well sufficient to allow Thomas Davis & Cherron Davis to locate the well on the claimant's property; (c) the reasons the claimant believes that the Davis Farm LLC. withdrawal has caused an adverse impact on the claimants well(s).

## **CLAIM RESOLUTION**

Thomas Davis will review any claim within **five (5) business days**. If Thomas Davis determines that no rebuttal will be made and accepts the claim as valid, Thomas Davis will so notify the claimant and will implement mitigation within **thirty (30) business days**. If the claim is not accepted as valid, Thomas Davis will notify the claimant that (a) the claim is denied **or** (b) that additional documentation from the claimant is required in order to evaluate the claim. Within **fifteen (15) business days** of receiving additional documentation from the claimant, Thomas Davis will notify the claimant (a) that Thomas Davis agrees to mitigate adverse impacts **or** (b) the claim is denied. If the claim is denied, the claimant will be notified that the claimant may request the claim be evaluated by a three (3) member committee. This committee will consist of one (1) representative selected by Thomas Davis one (1) representative selected by the claimant, and one (1) representative mutually agreed upon by the claimant and Thomas Davis.

Any claimant requesting that a claim be evaluated by the committee should provide the name and address of their representative to Thomas Davis. Within **five (5) business days** of receipt of such notification, Thomas Davis will notify the claimant and claimant's representative of the identity of Thomas Davis representative and instruct the representatives to select a third representative within **ten (10) business days**. Representatives should be a professional engineer or hydrogeologist with experience in the field of groundwater hydrology. Thomas Davis agrees to reimburse the members of the committee for reasonable time spent, at a rate prevailing in the area for experts in the above listed fields, and for direct costs incurred in administering the plan. The claimant may, at his or her option, choose to provide the reimbursement for the member of the committee selected by the claimant and up to half of the reimbursement for the mutual representative.

Within **ten (10) business days** of selection of the third representative, the committee will establish a **reasonable deadline** for submission of all documentation it needs to evaluate the claim. Both the claimant and Thomas Davis will abide by this deadline.

Within **fifteen (15) business days** of receipt of documentation, the committee will evaluate the claim and reach a decision by majority vote. The committee will notify the claimant regarding its decision to (a) deny **or** (b) approve the claim. If the claim is approved, Thomas Davis will mitigate the adverse impacts within **thirty (30) business days** of making the decision **or** as soon as practical. If the claim is denied by the committee, Thomas Davis may seek reimbursement from the claimant for the claimant's committee representative and one half of the 3<sup>rd</sup> representative on the committee.

If a claimant within the indicated area of impact indicates that they are out of water, Thomas Davis will accept the responsibility of providing water for human consumptive needs within **seventy-two (72) hours** and to cover the claim review period. Thomas Davis reserves the right to recover the cost of such emergency supply if the claim is denied by Thomas Davis or found to be fraudulent or frivolous. If Thomas Davis denies a claim and the claimant elects to proceed with the three (3) member committee, Thomas Davis will continue the emergency water supply at the claimant's request during the committee's deliberations but reserves the right to recover the total costs of emergency water supply in the case that the committee upholds the denial of the claim. Similarly, Thomas Davis reserves the right to recover costs associated with the claim process if a claim is found to be fraudulent or frivolous.

If it is determined by the committee or shown to the committee's satisfaction that a well operating under a mitigation plan similar to Thomas Davis / Davis Farm LLC. Plan other than those owned and operated by Thomas Davis has contributed to the claimed adverse impact, Thomas Davis's share of the costs associated with mitigation will be allocated in proportion to its share of the impact. Such a determination shall be made by the committee after notification of the third party well owner, giving the third party well owner opportunity to participate in the proceedings of the committee.

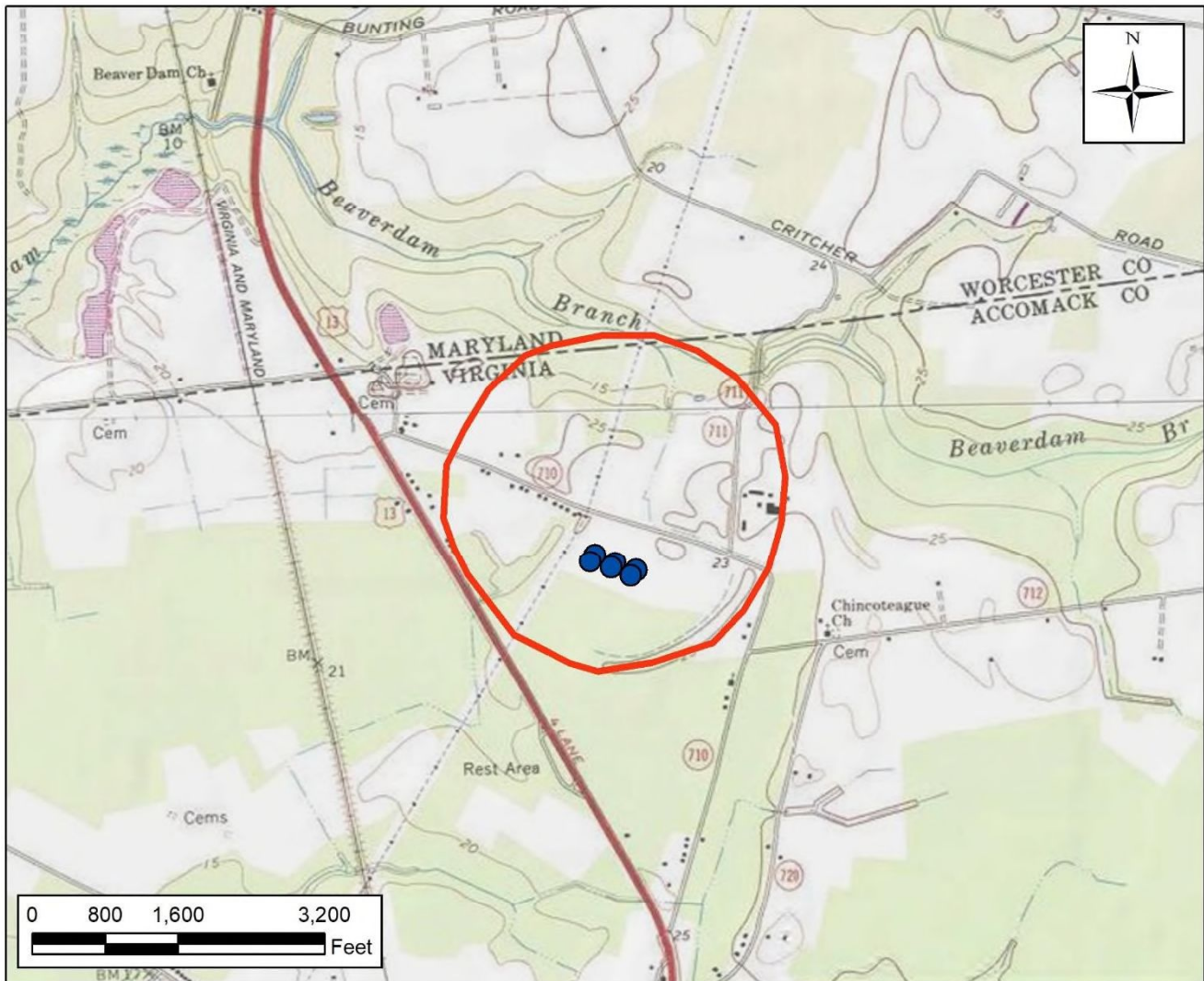
### **PLAN ADMINISTRATION**

Nothing in the Plan shall be construed to prevent the Department of Environmental Quality Staff from providing information needed for resolution of claims by the committee.



# HT Poultry Farm

## Area of Impact - MiddleYorktown-Eastover Aquifer



● HT Poultry Farm Wells

○ Middle Yorktown-Eastover Aquifer Area of Impact

Simulated drawdown at or exceeding one foot in the Middle Yorktown-Eastover aquifer resulting from a 5,700,000 gallons per year (15,616 average gpd), 50 year withdrawal from the Middle Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.5 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply  
December 14, 2018





Farm Name: \_\_\_\_\_  
 County: ACCOMACK  
 Permit Application Water Usage Calculations

### Facility Information

\_\_\_\_\_ houses @ 40 ft width  
 \_\_\_\_\_ houses @ 50 ft width  
 \_\_\_\_\_ houses @ 60 ft width  
8 houses @ 66 ft width  
 \_\_\_\_\_ flocks per year

### Consumption

Attach a farm-specific table of daily water consumption data for one (1) flock. (See attached example table)

Assuming that water consumption remains generally constant from flock to flock, the annual flock consumption may be estimated as follows:

$$\text{Annual Flock Consumption} = \frac{61,426 \text{ gal}}{\text{flock}} \times \frac{5.5 \text{ flock}}{\text{yr}} = \frac{337,843 \text{ gal}}{\text{yr}}$$

$$\begin{array}{r} 337,843 \\ \times 8 \\ \hline 2,702,744 \end{array}$$

The maximum monthly flock consumption may be estimated by adding up the daily water consumption for the last 31 days of the flock cycle (typically Days 20-50 of a 50 day flock cycle).

$$\text{Max Monthly Flock Consumption} = \sum_{\text{Day 20}}^{\text{Day 50}} \text{Daily Water Consumption} = \frac{51,426 \text{ gal}}{\text{mo}}$$

$$\begin{array}{r} 51,426 \\ \times 8 \\ \hline 411,408 \end{array}$$

## Cooling

Per Figure 12 of University of Georgia, Poultry Housing Tips (Evaporative Cooling Pad System Water Usage), Volume 29, Number 1, 2017, the evaporative cooling pad water usage per tunnel fan capacity is estimated as follows:

$$\text{Annual Unit Cooling (Easton, MD)} \approx \frac{160,000 \frac{\text{gal}}{\text{yr}}}{100,000 \text{ cfm}} \approx \frac{1.6 \frac{\text{gal}}{\text{yr}}}{1 \text{ cfm}}$$

Per Page 6 of Cobb-Vantress, Broiler Management Guide, November 15, 2013, the tunnel fan capacity (operating at an airspeed of 600 fpm) may be estimated as follows:

### *Tunnel Fan Capacity*

$$\begin{aligned} &= \left[ 228,000 \frac{\text{cfm}}{40 \text{ ft width}} \times \text{_____ houses @ 40 ft width} \right] \\ &+ \left[ 285,000 \frac{\text{cfm}}{50 \text{ ft width}} \times \text{_____ houses @ 50 ft width} \right] \\ &+ \left[ 342,000 \frac{\text{cfm}}{60 \text{ ft width}} \times \text{_____ houses @ 60 ft width} \right] \\ &+ \left[ 376,200 \frac{\text{cfm}}{66 \text{ ft width}} \times \underline{8} \text{ houses @ 66 ft width} \right] \\ &= \underline{3'009'600} \text{ cfm} \end{aligned}$$

Given the annual unit cooling and tunnel fan capacity, the annual cooling may be estimated as follows:

$$\text{Annual Cooling} = \underline{3'009'600} \text{ cfm} \times \frac{1.6 \frac{\text{gal}}{\text{yr}}}{1 \text{ cfm}} = \underline{4'815'360} \frac{\text{gal}}{\text{yr}}$$

### Requested Withdrawal Amounts

The total annual withdrawal amount may be estimated by adding the annual flock consumption and the annual cooling amounts.

$$\text{Annual Amount} = \frac{2'702'744}{\text{yr}} \frac{\text{gal}}{\text{yr}} + \frac{4'815'360}{\text{yr}} \frac{\text{gal}}{\text{yr}} = \frac{5'712'344}{\text{yr}} \frac{\text{gal}}{\text{yr}}$$

The total monthly withdrawal amount may be estimated by adding the maximum monthly flock consumption amount and one-third of the annual cooling amount (annual cooling divided by 3).

$$\text{Monthly Amount} = \frac{411,408}{\text{mo}} \frac{\text{gal}}{\text{mo}} + \left[ \frac{4'815'360}{3} \frac{\text{gal}}{\text{yr}} \right] = \frac{2'016'528}{\text{mo}} \frac{\text{gal}}{\text{mo}}$$

1,605,120

Farm Name: HT Poultry Farm  
County: Accomack  
Permit Application Water Usage Calculations

### **Facility Information**

\_\_\_\_\_ houses @ 40 ft width

\_\_\_\_\_ houses @ 50 ft width

\_\_\_\_\_ houses @ 60 ft width

6 houses @ 66 ft width

\_\_\_\_\_ flocks per year

### **Consumption**

Attach a farm-specific table of daily water consumption data for one (1) flock. See attached example table. This example includes water use for all houses for one flock. If meter data is for only one house and all houses are similar in size, the limits below will need to be multiplied by the number of houses.

Assuming that water consumption remains generally constant from flock to flock, the annual flock consumption may be estimated as follows:

$$\text{Annual Flock Consumption} = \underline{61,426} \frac{\text{gal}}{\text{flock}} \times \underline{5.5} \frac{\text{flock}}{\text{yr}} = \underline{337,843} \frac{\text{gal}}{\text{yr}}$$

$$\text{Total Annual Consumption: } \underline{337,843} \text{ gal/yr} \times \underline{6} \text{ houses} = \underline{2,027,058} \text{ gal/yr}$$

The maximum monthly flock consumption may be estimated by adding up the daily water consumption for the last 31 days of the flock cycle (typically Days 20-50 of a 50 day flock cycle).

$$\text{Max Monthly Flock Consumption} = \sum_{\text{Day 20}}^{\text{Day 50}} \text{Daily Water Consumption} = \underline{51,426} \frac{\text{gal}}{\text{mo}}$$

$$\text{Total Monthly Consumption: } \underline{51,426} \times \underline{6} \text{ houses} = \underline{308,556} \text{ gal/month}$$

## **Cooling**

Per Figure 12 of University of Georgia, Poultry Housing Tips (Evaporative Cooling Pad System Water Usage), Volume 29, Number 1, 2017, the evaporative cooling pad water usage per tunnel fan capacity is estimated as follows:

$$\text{Annual Unit Cooling (Easton, MD)} \approx \frac{160,000 \frac{\text{gal}}{\text{yr}}}{100,000 \text{ cfm}} \approx \frac{1.6 \frac{\text{gal}}{\text{yr}}}{1 \text{ cfm}}$$

Per Page 6 of Cobb-Vantress, Broiler Management Guide, November 15, 2013, the tunnel fan capacity (operating at an airspeed of 600 fpm) may be estimated as follows:

### *Tunnel Fan Capacity*

$$\begin{aligned} &= \left[ 228,000 \frac{\text{cfm}}{40 \text{ ft width}} \times \text{_____ houses @ 40 ft width} \right] \\ &+ \left[ 285,000 \frac{\text{cfm}}{50 \text{ ft width}} \times \text{_____ houses @ 50 ft width} \right] \\ &+ \left[ 342,000 \frac{\text{cfm}}{60 \text{ ft width}} \times \text{_____ houses @ 60 ft width} \right] \\ &+ \left[ 376,200 \frac{\text{cfm}}{66 \text{ ft width}} \times \text{___6___ houses @ 66 ft width} \right] \\ &= \text{___2,257,200___ cfm} \end{aligned}$$

Given the annual unit cooling and tunnel fan capacity, the annual cooling may be estimated as follows:

$$\text{Annual Cooling} = \text{___2,257,200___ cfm} \times \frac{1.6 \frac{\text{gal}}{\text{yr}}}{1 \text{ cfm}} = \text{___3,611,520___} \frac{\text{gal}}{\text{yr}}$$

### **Requested Withdrawal Amounts**

The total annual withdrawal amount may be estimated by adding the annual flock consumption and the annual cooling amounts.

$$\text{Annual Amount} = \underline{\underline{2,027,058}} \frac{\text{gal}}{\text{yr}} + \underline{\underline{3,611,520}} \frac{\text{gal}}{\text{yr}} = \underline{\underline{5,638,578}} \frac{\text{gal}}{\text{yr}}$$

The total monthly withdrawal amount may be estimated by adding the maximum monthly flock consumption amount and one-third of the annual cooling amount (annual cooling divided by 3).

$$\text{Monthly Amount} = \underline{\underline{308,556}} \frac{\text{gal}}{\text{mo}} + \left[ \frac{3,611,520 \frac{\text{gal}}{\text{yr}}}{3} \right] = \underline{\underline{1,512,396}} \frac{\text{gal}}{\text{mo}}$$

### **DEQ calculated volumes**

- Yearly: 5,650,000 gal
- Monthly: 1,600,000 gal

### **T.E Requested volumes**

- Yearly: 9,400,000 gal
- Monthly: 3,500,000 gal

# Example (Below table is just an example – use metered data for your facility or one similar)

Table 1 - Example Flock Water Consumption(gallons)

Day	House #1 Water Use (Gal)	House #2 Water Use (Gal)	House #3 Water Use (Gal)	House #4 Water Use (Gal)	House #5 Water Use (Gal)	House #6 Water Use (Gal)	House #7 Water Use (Gall)	House #8 Water Use (Gal)	Total
1	6	37	84	57	77	73	3	0	337
2	72	90	167	113	173	118	61	11	805
3	135	160	244	187	252	216	94	36	1,324
4	138	178	278	229	291	274	140	62	1,590
5	161	206	313	263	332	308	215	94	1,892
6	222	270	377	342	404	358	255	137	2,365
7	272	323	427	410	443	468	322	191	2,856
8	354	402	561	539	545	665	425	252	3,743
9	383	436	569	553	574	722	648	569	4,454
10	412	466	621	579	619	593	582	402	4,274
11	439	522	650	647	696	715	675	500	4,844
12	481	576	708	732	710	823	760	609	5,399
13	522	615	780	782	842	897	855	718	6,011
14	516	584	765	764	826	860	806	677	5,798
15	639	732	821	882	894	976	895	806	6,645
16	652	739	900	968	957	1041	937	869	7,063
17	695	790	1023	1020	982	1061	1007	814	7,392
18	741	848	1067	1008	1018	1154	1127	1026	7,989
19	798	899	1101	952	1095	1216	1086	1084	8,231
20	835	954	1148	1323	1169	1332	1334	1177	9,272
21	863	965	1209	1312	1187	1432	1364	1253	9,565
22	908	1034	1328	1340	1259	1529	1439	1341	10,178
23	955	1139	1424	1396	1390	1632	1524	1393	10,853
24	975	1154	1480	1430	1475	1717	1600	1443	11,274
25	1023	1180	1527	1458	1548	1791	1709	1545	11,781
26	1094	1245	1602	1572	1595	1885	1829	1636	12,458
27	1147	1334	1695	1648	1661	1843	1927	1722	12,977
28	1159	1358	1691	1654	1675	1740	1922	1725	12,924
29	1197	1442	1733	1653	1775	2079	1984	1670	13,533
30	1246	1473	1812	1679	1719	2146	1981	1727	13,783
31	1208	1397	1723	1654	1717	2072	1899	1667	13,337
32	1390	1534	1831	1769	1845	2146	1911	1762	14,188
33	1436	1532	1905	1835	1878	2072	2130	1857	14,645
34	1435	1552	1865	1907	1930	2081	2121	1922	14,813
35	1411	1504	1759	1829	1880	2262	2153	1920	14,718
36	1406	1571	1882	1817	1918	2338	2208	1979	15,119
37	1622	1654	2077	2008	1982	2200	2219	2167	15,929
38	1646	1700	2150	2070	2079	2301	2212	2051	16,209
39	1661	1784	2199	2130	2086	2413	2498	2085	16,856
40	1773	1824	2270	2240	2172	2643	2508	2270	17,700
41	1872	1924	2340	2290	2189	2639	2437	2340	18,031
42	1818	2046	1940	2360	2230	2675	2464	2239	17,772
43	1905	2079	2350	2410	2284	2593	2541	2370	18,532
44	2010	2154	2480	2480	2321	2670	2590	2387	19,092
45	2143	2197	2570	2513	2378	2689	2642	2461	19,593

46	2246	2240	2590	2543	2410	2764	2687	2497	19,977
47	2379	2346	2620	2594	2467	2798	2741	2532	20,477
48	2854	2470	2680	2670	2497	2860	2796	2576	21,403
49	2940	2580	2800	2689	2540	2893	2860	2624	21,926
50	2950	2670	2801	2700	2589	2940	2940	2700	22,290
Total	57,145	60,909	72,937	72,000	71,575	81,713	78,063	69,895	564,237